

THE MEDICAL JOURNAL OF AUSTRALIA

VOL. I.—15TH YEAR.

SYDNEY, SATURDAY, FEBRUARY 25, 1928.

No. 8.

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Table of Contents

[The Whole of the Literary Matter in THE MEDICAL JOURNAL OF AUSTRALIA is Copyright.]

ORIGINAL ARTICLES—

	PAGE.
"Addison's (Pernicious) Anæmia," by S. O. COWEN, M.D.	226
"Some Notes on Glaucoma," by J. B. LEWIS, M.B., B.S.	232
"Doctor Webster's Wiles: The Tragedy of an Only Child," by F. KINGSLEY NORRIS, M.D.	234
"The Introduction of Intratracheal Catheters," by A. B. KEITH WATKINS, M.S., F.R.C.S.	237
"Blood Transfusion of Infants," by G. J. LILLIE, M.B., B.S.	238

REPORTS OF CASES—

"A Pyogenic Verrucose Dermatitis," by NORMAN PAUL, M.B., Ch.M.	240
"A Case of Colloid Milium," by A. C. ARNOLD, M.B.	241

REVIEWS—

Bacteriology	241
Osler's Medicine	242
Psychology	242

LEADING ARTICLES—

The Branches and the Journal	243
--	-----

CURRENT COMMENT—

The Sphincter of Oddi	244
---------------------------------	-----

ABSTRACTS FROM CURRENT MEDICAL LITERATURE—

Surgery	246
-------------------	-----

SPECIAL ABSTRACT—

The Reticulo-Endothelial System	248
---	-----

AUSTRALASIAN ASSOCIATION FOR THE ADVANCEMENT OF SCIENCE

251

CORRESPONDENCE—

Medical Education	256
Pathological Service	256
Pain Production in Abdominal Visceral Disease	257
The Sympathetic Innervation of Skeletal Muscle	257

OBITUARY—

Alexander Wellesley Finch Noyes	258
Henry Charles Morriset Delohery	258

AN APOLOGY

258

MEDICAL APPOINTMENTS VACANT, ETC.

258

MEDICAL APPOINTMENTS: IMPORTANT NOTICE

258

EDITORIAL NOTICES

258

ADDISON'S (PERNICIOUS) ANÆMIA.¹

By S. O. COWEN, M.D. (Melbourne),

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YOUR invitation to address you on some topic concerned with diseases of the blood was the more generous in that you gave me a free hand in the selection of the actual subject. I had no hesitation in choosing Addison's or pernicious anæmia, not only for its intrinsic importance, but also because its consideration involves discussion of some fundamental hæmatological principles. You will notice that I have preferred the name Addison's anæmia; for I have none of the usual dislike of eponyms which, provided they designate worthy objects, serve as reminders of the history of our art and memorials of the names of the great. In this instance I think we should avail ourselves of the opportunity of commemorating the great British physician whose classical description of this disease was first in point of time and foremost in accuracy of observation and lucidity of expression.

The best definition of our subject is that of Osler:⁽¹⁾ "A recurring and usually fatal anæmia of unknown origin, characterized by hæmolysis and imperfect action of the blood-making organs." Why this has been altered in the last edition of the "Principles and Practice" I cannot imagine; terse yet comprehensive it embodies the essentials in a single sentence, exemplifying Osler's genius for definition. One aspect alone requires amplification; though best characterized as an anæmia, the disease shows itself in other symptoms, notably sore tongue and degenerative changes in the central nervous system, which are not directly dependent on and may long precede the onset of frankly anæmic manifestations. In the main our discussion will concern itself with the points indicated by the definition: the fundamental changes which underlie the blood picture, the course and clinical features, the ætiology, prognosis and treatment.

The Blood Picture.

In considering the blood changes in Addison's anæmia, I do not propose to inflict statistics on you or to enumerate lists of abnormal cells with unwieldy names, since the so-called typical blood picture which we learned by rote as students, often plays us false in practice. The reason for this is clear: the blood picture is not static but dynamic, it depends on the balance between hæmolysis and hæmatopoiesis, varying as these fluctuate in their relative intensity. We must direct our attention then to the fundamental processes of which the changes in the circulating blood are merely a reflection. If in this and other matters I deal with controversial points in summary and dogmatic fashion, I do so only in the hope of greater clearness.

The Hæmolytic Factor.

Let us consider first the hæmolytic factor. Thanks to the work of Aschoff⁽²⁾ and Van den Bergh⁽³⁾ the broad outlines of the process of blood destruction are now clear. It is a normal process which in health is so regulated and adjusted to the rate of blood formation that the number and quality of the red cells remain almost constant. The destruction of effete erythrocytes is a function of certain phagocytic connective tissue cells of mesenchymal origin which comprehend the reticulum and the walls of the sinuses of the spleen and lymphatic glands, the capillaries of the liver lobules (Kupffer's cells) and of the bone marrow. Aschoff's conception that the morphological and functional similarity of these widely scattered tissues justifies their designation as the reticulo-endothelial system is now generally accepted. Once engulfed by the cells of this system, the erythrocytes are broken down and the hæmoglobin thus liberated is split into bilirubin and a moiety which contains no iron. The bilirubin is the source of the bile pigments; it passes into the blood stream whence the liver cells pick it up and in some way modify it chemically before excreting it into the bile capillaries. The exact nature of this chemical change has not been determined, but its existence is revealed by the response to the Van den Bergh test; the delayed colour reaction of the immediate derivative of hæmoglobin contrasts with the prompt one of the product of the liver cells. When blood destruction is excessive, the hepatic cells cannot cope with the amount of pigment presenting itself to them and the bilirubin of the serum rises above the normal figure of 0.2 to one unit to between two and five units. This constitutes a true hæmolytic jaundice recognizable clinically, except in its slightest degrees, by increased yellowness of the serum and a lemon tint of the conjunctivæ and skin which differs from the deeper chrome yellow of the obstructive variety. But the difference between the two rests not only on mere tinctorial niceties; hæmolytic jaundice is said to be dissociated in that pigment alone is in excess; in the obstructive type bile salts too are resorbed giving rise to itching of the skin and slow pulse. Further the kidney behaves very differently in the two varieties; no matter how intense the hæmolysis, bile pigment as such does not pass into the urine, though the excretion of urobilin is increased; in obstructive jaundice a bilirubinæmia of more than two units gives rise to biluria. Despite these fundamental distinctions, we cannot, as did the older authorities, deny the title of jaundice to the pigmentation of patients suffering from Addison's anæmia.

The clinical recognition of a hæmolytic anæmia depends, then, in the first place, on the presence of non-obstructive jaundice. In its minor degrees this may be difficult to establish clinically, but fortunately we have in the Fouchet test a simple means of detecting increased bilirubinæmia. Two

¹ A clinical lecture delivered to the North-eastern Division of the Victorian Branch of the British Medical Association on November 30, 1927.

drops of the reagent¹ are mixed with two drops of the patient's serum: the development of a green colour within five minutes constitutes a positive reaction. This test, unlike that of Van den Bergh which is too complicated for bedside use, will not differentiate between an obstructive and a hæmolytic jaundice; the distinction must be made on the other clinical features to which I have alluded. Apart from the pigmentary changes, two other manifestations of excessive hæmolysis may help us to detect it: splenic enlargement, the result of work hypertrophy and fever due to the pyrogenic products of blood destruction.

The Factor of Abnormal Blood Formation.

But we must recognize that in relegating Addison's anæmia to the category of hæmolytic anæmias we are not establishing a fundamental diagnostic criterion. Excessive hæmolysis characterizes other anæmias, notably that associated with streptococcal sepsis and hæmolytic jaundice. In the latter, though the hæmolytic process is always more persistent and often more intense than in Addison's anæmia, blood formation is generally able to cope with the increased rate of destruction and the anæmia seldom approximates in severity to the pernicious type. This consideration almost forces on us the conclusion that in Addison's anæmia blood formation is in some way deficient. But the mere assumption of such a proposition does not suffice; we must inquire whether any supporting evidence can be adduced from the blood picture. First let us be quite clear that the appearance in the circulating blood of polychromatic, reticulated and stippled red cells, of normoblasts and even of megaloblasts is not characteristic of Addison's anæmia. These are all immature varieties of the normal erythrocyte thrust prematurely into circulation under intense and continuous stimulation of the bone marrow; they may be seen in the anæmias resulting from severe hæmorrhage as well as in hæmolytic jaundice and intense streptococcal septicæmia. The older conception of a "megaloblastic degeneration" of the bone marrow characterizing Addison's anæmia is no longer tenable. But there is one feature of the red cells which is confined to Addison's anæmia and the closely related diseases: sprue and *Bothriocephalus latus* infestation and occasional instances of the grave anæmia of pregnancy. I refer to macrocytosis. Measurements made by the tedious method of Price-Jones⁽⁴⁾ demonstrate that in these conditions not only do occasional well-stained large cells appear, but the average diameter of the red corpuscles is increased. In this country therefore we can say that except in rare cases in pregnant women a macrocytic anæmia is synonymous with Addison's anæmia. Unfortunately the time required for the individual measurement of several hundred red cells rules out the Price-Jones method in ordinary clinical work. Haden⁽⁵⁾ has evolved a

simpler method based on the fact that when a certain volume of blood is centrifuged under standard conditions, the corpuscles owing to their increased size form a larger bulk relative to the plasma than in other anæmias. Its accuracy therefore depends on comparative measurements and necessitates a high-powered centrifuge of constant speed such as few of our laboratories can yet boast. Recognition of the presence of macrocytosis in ordinary stained films is very difficult and demands more experience than most of us possess. Its presence is generally revealed by a rise in the colour index above unity, for the macrocyte is a functional as well as a structural giant, each cell carrying more than the normal complement of hæmoglobin. I would here like to point out that a colour index slightly below one does not exclude Addison's anæmia; our clinical methods of hæmoglobin estimation are not really accurate. There is great dispute as to the exact genealogy of the macrocyte. I think the available evidence justifies the assumption that macrocytosis represents an abnormal and reversionary type of blood formation, seen only in the small group of diseases we have enumerated. It persists in natural remissions even when the number of red cells approaches the normal standard, but is greatly lessened by liver feeding.

The Interrelation Between the Two Processes.

We cannot leave this aspect of the subject without considering the relation to each other of these two fundamental factors in the production of the blood picture. There are two conflicting views: one that excessive hæmolysis is the primary process from which results a stimulus sufficiently intense to cause the bone marrow in certain cases to revert to an embryonic method of hæmatopoiesis; the other that the marrow affection is primary and that hæmolysis is excessive only because of the inferior type of cell presenting itself to a normally functioning reticulo-endothelial system. The former best fits the known clinical facts, but the evidence is not sufficiently conclusive for a final solution of the problem. From a diagnostic point of view the matter is not vital, but for successful treatment identification of the fundamental process must precede the detection and eradication of the ultimate cause.

Though evidences both of excessive destruction and abnormal formation of blood are generally obvious in an individual patient, one or other may predominate. On this ground Minot⁽⁶⁾ makes a distinction of some practical value between hæmolytic and myelotoxic types of the disease; the former is less rapidly progressive, subject to longer and better remissions and more amenable to treatment, while the latter is more relentless in its progress and approximates in general to aplastic anæmia.

Other Clinical Features and Course of Addison's Anæmia.

Some other clinical features of diagnostic and therapeutic importance beside those mentioned in the discussion of the blood picture require com-

¹ Fouchet's reagent: Trichloroacetic acid five grammes, 10% ferric chloride, two cubic centimetres, distilled water twenty cubic centimetres.

ment. The onset is most insidious; as Addison⁽⁷⁾ himself expressed it:

It makes its approach in so slow and insidious a manner, that the patient can hardly fix a date to his earliest feeling of that languor which is shortly to become so extreme.

By the time the patient comes under observation the total number of red cells has generally dropped to 2,000,000 per cubic millimetre or lower. The general condition does not decline *pari passu* with the fall in the red count; in no other type of anæmia are patients with such low figures able to undertake moderate mental and physical exertion. Addison spoke of the "strongly marked tendency to the formation of fat" so often noticed in sufferers from this disease; on closer analysis it is found that most of the patients have lost some weight, but the loss amounts to a few pounds only and the association of extreme pallor with little wasting is often striking.

Hunterian glossitis is one of the most notable clinical features of Addison's anæmia and its appearance is so well known as not to need further description. One or two points, however, may be emphasized. Its occurrence is not constant; though Hunter⁽⁸⁾ insists on its invariable presence, it probably does not occur at any time during the course of the disease in 50% of the patients. It may long precede the appearance of gross anæmia. The soreness comes in bouts, often being most intense when the anæmia is in remission and *vice versa*. The fundamental importance ascribed by Hunter to glossitis, not only as a diagnostic feature but as

having great ætiological significance, is not now accepted and oral sepsis has been relegated to a secondary place in the causation.

The most striking clinical feature of Addison's anæmia is the occurrence of remissions. They occur in 90% of cases; the average number is two and the average duration four months. Both these figures may be greatly exceeded; as many as four or five remissions may occur and occasionally, as is shown in the accompanying graph, one lasts for years. During most remissions the red count remains low, perhaps reaching a figure of three or three and a half millions with a colour index a little above unity, but sometimes a normal count may be regained. The macrocytosis and achlorhydria, however, persist, though the bilirubin content of the serum returns to normal. So characteristic are remissions and exacerbations that their occurrence or even the history of their occurrence is often of great diagnostic value. Their apparent spontaneity renders the assessment of methods of treatment difficult. The mechanism of the production of remissions, which must surely have great bearing on the ætiology of Addison's anæmia, remains an unsolved problem.

Achlorhydria must for practical purposes be regarded as a constant finding and as Dr. J. F. Wilkinson was one of the first to show, it may long precede the development of the anæmia. Its diagnostic value is therefore great. Hurst and others, moreover, believe that it is the essential causal factor of Addison's anæmia; we must con-

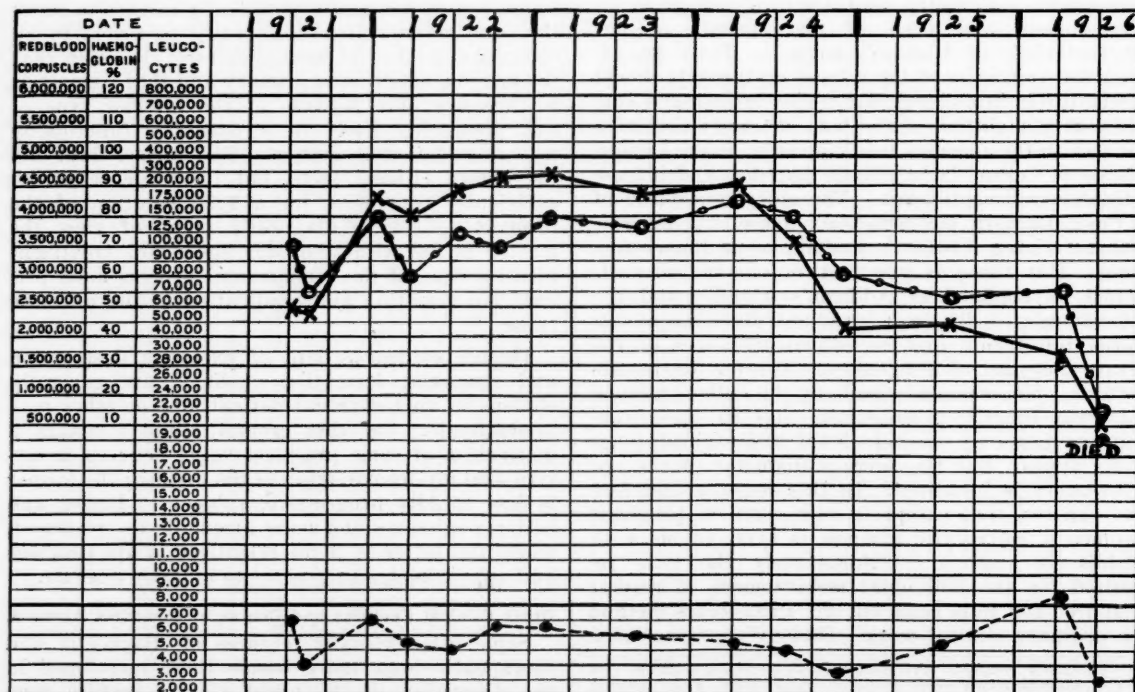


Chart showing an unusually long remission and exacerbation in a female patient, aged 42. The red cells are indicated by the line of interrupted crosses, the hæmoglobin by the line of circles and the white cells by the line of black dots.

sider this view at some length in discussing the ætiology. One caution is necessary: achlorhydria may accompany or result from any intense anæmia irrespective of its causation. It is the earliness and constancy of achylia which renders it so valuable in the diagnosis of Addison's anæmia.

The occurrence of lesions in the central nervous system is one of the most striking features of Addison's anæmia. Woltman's⁽⁹⁾ statement that definite organic signs may be found in 80% and that subjective nervous symptoms bring 12% of the patients to a physician is generally accepted. My own figures are not so high, but the importance of these nervous phenomena cannot be overestimated. The large majority of patients presenting themselves with frank Addison's anæmia will on inquiry admit to paræsthesia of the extremities and in most of them impairment of vibration sense—one of the earliest objective signs to appear—can be demonstrated. On the other hand, patients with fully developed subacute combined degeneration, though their complexion may not give the slightest hint of anæmia, can always be shown by ordinary clinical means to have an anæmia of the Addisonian type. An interesting fact and one that will have to be explicable by any complete theory of the ætiology is that though most patients with predominant symptoms of subacute combined degeneration ultimately develop frank Addison's anæmia, the reverse is not true. In most cases of Addison's anæmia the nervous manifestations are of minor intensity; Collier⁽¹⁰⁾ states that:

No case has ever been recorded in the literature, nor has one occurred in the very large series examined by the writer, in which the nervous manifestations developed in a patient already under observation for anæmia.

This is in the main true, but like all generalizations it has its exceptions. I have seen one case in which a rapidly progressive spastic paraplegia occurred eighteen months after the onset of severe and typical Addisonian anæmia.

Hæmorrhages into the retina may occur in any grave anæmia, but they are much more common and numerous in the Addisonian than in other types. Occasionally in Addison's anæmia there is gross bleeding from mucous membrane, especially that of the genito-urinary tract. This liability to hæmorrhage is generally ascribed to the diminution in the number of platelets which is a constant finding.

Ætiology.

Recent discussions on the ætiology of Addison's anæmia both in Great Britain and the United States have reflected a renewal of interest in the fundamental problems of the causation of disease in general. It may therefore be of interest to sketch briefly the trend of modern thought in this direction and to indicate its significance as regards the pathogenesis of Addison's anæmia.

Disease is the resultant of the interaction of two forces: the external agent and the reactive powers of the subject. The latter factor has in our genera-

tion been sadly neglected; dazzled by the ætiological promise and performance of bacteriology, we have been prone to treat the malady rather than the man. Recognition of this tendency has resulted in an attempt to define and classify the profound but unformulated knowledge of constitution and diathesis on which our forebears set such store. Draper,⁽¹¹⁾ in America, and Hurst,⁽¹²⁾ in England, have led the field and it is largely from their work that my information is derived. The reactive powers of the individual depend partly on his constitutional characters, hereditary and acquired, and partly on external factors such as malnutrition, alcoholism and the like. Constitution may be defined as:

The aggregate of the hereditary characters, anatomical, physiological, immunological and psychological which determines the individual's reaction, successful or unsuccessful, to the stress of environment. Constitutional variations may be advantageous to the individual or, on the other hand, they may make him more prone than the average individual to develop certain diseases. It is the latter type of variation which constitutes a diathesis which may be defined as an inherent tendency to react unfavourably to external stimuli so that disease results.

The relative parts played by external and constitutional factors vary very greatly. In injuries the first is overwhelmingly important, but its extent and its consequences may be modified by reactive processes. In hæmophilia, on the other hand, hereditary constitution is paramount, but again external agents, trivial injuries for example, may determine active disease and even death. The majority of medical diseases occupy a position intermediate between these two extremes. Take for example pulmonary tuberculosis: the substitution of constitution and external agent for the words soil and seed of Osler's parable will make clear the whole subject.

It is to this intermediate group that Addison's anæmia belongs. The very elusiveness of the external agent suggests that it is some common, frequently encountered noxa which produces the disease only in subjects who are constitutionally predisposed to react unfavourably to it; all attempts to identify it have so far failed. The suggestion that liability to develop Addison's anæmia in part depends on hereditary characters is supported by the occasional familial incidence of the disease. For instance, I have notes of four cases in two generations of one family and of two brothers in another family who developed the disease, though living far apart and under very different conditions. Larger and more striking family histories of this kind are recorded in the literature. Finally, there is a tendency to identify the diathesis with certain physical peculiarities of build and facial conformation. It did not escape the all-observant Addison that "the disease occurs chiefly in persons of a somewhat large and bulky frame with a strongly marked tendency to the formation of fat." Draper's anthropometric studies have led him to the conclusion that the tendency to develop nephritis, acromegaly, hypertension and Addison's anæmia is expressed in a facial conformation peculiar to each

disease. The Addisonian patients, he says, "are generally short chested with a wide epigastric angle and have widely separated eyes and large jaw angles." Looking back over my own patients I find that most of them conform to this type. Although the facts are not yet well enough established to be of direct clinical utility and the marks of the diathesis not sufficiently clearly defined to be identified with certainty, the constitutional factor is worthy of recognition and further study.

Various speculations as to its exact nature have been advanced, but none will bear close scrutiny. Hurst's⁽¹³⁾ hypothesis is the most elaborate. He identifies *achylia gastrica* as the hereditary factor, but admits that it occurs in 4% of all adults of whom only a small proportion develop Addison's anaemia. The discrepancy is accounted for by supposing that only a small percentage of persons with achylia are exposed to infection by the organisms which are the determining cause of the disease. There are two valid criticisms against this view. Attempts to establish the bacteriology have failed and the organisms which have been incriminated by Hurst, are so common that all achlorhydric subjects must be exposed to them and a further constitutional liability to infection must be predicated. Hurst's hypothesis has the merit, however, of being sufficiently comprehensive to attempt to account for the widespread manifestations of the disease and of indicating a useful auxiliary method in its treatment. Another hypothesis, that of Piney,⁽¹⁴⁾ attempts to incriminate congenital abnormality of structure and function of the haemopoietic system; this fails in comprehensiveness in that it seems impossible that faults in blood formation should account for such diverse symptoms as glossitis, achlorhydria and nervous changes.

Stimulating as is this conception of the two aetiological aspects of Addison's anaemia, we must admit that it is as yet merely speculative. Our knowledge of the pathogenesis may be summed up by saying that we suspect the existence of a constitutional predisposition, a diathesis, to react unfavourably to some external agent as yet unidentified.

Diagnosis and Differential Diagnosis.

Let us summarize as briefly as possible the chief points in the diagnosis of Addison's anaemia. It belongs to the group of haemolytic anaemias as evidenced by non-obstructive jaundice, enlargement of the spleen and fever; with the exception of rare cases in pregnant women it is the only macrocytic anaemia indigenous to this country; achlorhydria is a constant finding and one that long precedes the development of actual anaemia; certain clinical features are peculiar to it, especially glossitis, involvement of the central nervous system and a course marked by remissions and exacerbations; and, finally, there is a complete absence of discoverable cause. It is obvious that the diagnosis can be made only by carefully weighing all the evidence and that the blood picture, as determined

by ordinary clinical methods, will not suffice for diagnosis, unless it is supported by the occurrence of the characteristic clinical signs.

Differential diagnosis is seldom difficult, though individual cases may sometimes be very puzzling. The anaemia accompanying cancer of the stomach may be of the pernicious type, but haemolytic features are absent and the X ray picture is generally conclusive. In other secondary anaemias the haemolytic factor is again wanting and a cause is usually demonstrable. Anaemias secondary to long continued bleeding from the rectum or uterus seem more prone than others to simulate Addison's anaemia, and should be excluded by careful inquiry, and, when necessary, visual examination. In the more severe cases of haemolytic jaundice the blood picture may be confusing, but though fluctuations of intensity occur, there are no true remissions, familial incidence is the rule and the corpuscular fragility is increased. The anaemia of tertiary syphilis more often simulates Banti's disease than Addison's anaemia, but occasional cases may be very puzzling. It should be emphasized that true Addison's anaemia may occur in a patient whose serum gives a positive Wassermann reaction. The therapeutic test, though seldom required, is conclusive. Myxoedema is sometimes mistaken for Addison's anaemia because of the general weakness and sallow colour which accompany it. Although moderately severe secondary anaemia may accompany myxoedema, the clinical features are so striking that the mistake is one which should never arise. Occasionally the symptoms of Addison's anaemia are predominantly cardiac in type; the breathlessness, precordial pain and oedema may suggest a diagnosis of cardiac failure, but the blood picture and other characteristics should suffice to indicate the true diagnosis.

Treatment.

The treatment of Addison's anaemia has been revolutionized by the recent discovery by Minot and Murphy of the efficacy of liver feeding. You are doubtless familiar with the recent articles in *THE MEDICAL JOURNAL OF AUSTRALIA* and *The British Medical Journal* dealing with the underlying principles and giving statistics of the successful use of the method in hundreds of cases. I will therefore confine my remarks to the practical aspects of the matter, dwelling especially on those points which my own brief experience has emphasized.

Minot and Murphy⁽¹⁵⁾ state the daily requirements of the special diet as follows:

1. Liver (calves', beef, chicken) or kidneys (lamb) freshly cooked. At least 120, preferably 200 or more, grammes (cooked weight). Cook without fat; broil, bake, boil, mince or make into soup.
2. Fruits, preferably fresh—especially peaches, apricots, pineapple, strawberries, oranges and grapefruit—about 400 grammes. Raisins desirable; allow them to be eaten freely.
3. Red muscle meat, trimmed free of fat, freshly cooked; 100 grammes or more. Beef heart desirable.
4. Vegetables containing 1 to 10 per cent. of carbohydrate, preferably fresh, cooked or raw. Not less than

300 grammes. Lettuce, spinach, asparagus, cabbage and tomato are specially desirable.

5. Fats restricted, not over 70 grammes. Avoid cheese, bacon, fried food. Allow but little cream and butter, and not over one egg. Use mineral oil for salad dressings.

6. Avoid grossly sweet foods, yet allow sugar sparingly.

7. Starchy foods, as cereals, potato, breads, add to suit individual desires, but not to exclusion of the requirements given above. Starchy foods best be crusty or dextrinated. Whole wheat toast is desirable.

8. Milk best be limited to about 240 grammes.

9. Avoid excess of salt. Tea and coffee as desired.

It is of course not always possible for a patient who is very seriously ill, to take this quantity straight away. Minot emphasizes that liver and fruit are the most important foods and that these should be given first; as the patient improves, the quantities are increased and the other articles of diet added until the full daily ration as outlined is reached.

The greatest difficulty presented by this *régime* lies in inducing patients who do not like liver, to consume half a pound of it a day. To do so demands considerable culinary skill on the part of the nurse or other attendant and the medical man must be familiar with the best method of concocting appetizing dishes from the liver. Provided it is not cooked too long, it can be given in any form that appeals to the patient. The ordinary dish of liver and bacon, minced liver, raw or cooked, on toast or in sandwiches, raw or lightly boiled liver grated and added to soup or mixed with orange juice as a drink have so far served with my own patients. Other suggestions are for a liver cocktail compounded with tomato catchup, lemon juice, Worcester sauce and onion and for the addition of anchovy paste to the sandwiches. In one of the patients whose history was detailed by Professor Elliot,⁽¹⁶⁾ it was necessary to resort to daily administration by the stomach tube, but fortunately such heroic measures are rarely required. There is every hope that we shall soon be in possession of the active principle. Cohn and Minot have already obtained an active fraction of which ten to twenty grammes daily will produce the desired effect; it is free of iron, protein and carbohydrate and appears to be either a polypeptide or a nitrogenous base. The day is probably not far distant when it may be possible to give the essential substance in mixture or tablet form.

For the present we can assure our patients that the effort demanded by the consumption of the liver ration will certainly be rewarded by lasting improvement. Minot and Murphy's⁽¹⁷⁾ recently published results show that in only 5% of 125 patients did the red count fail to rise to over four million and that these failures were attributable to inability to take the liver diet or to the existence of complications. The six patients whom I have at present under treatment, have all responded rapidly and satisfactorily and I have been especially interested to observe that two patients with subacute combined degeneration without intense anæmia have lost most of the unpleasant subjective sensations

though the signs of organic nervous changes remain unaltered. Minot and Murphy suggest that "it is reasonable to attribute the greater part of such improvement to increase of muscular strength secondary to the continuous high level of the red blood corpuscles"; but in both my patients the subjective symptoms have been improved before the blood count has shown much alteration. As to the permanence of these results it is as yet too early to speak with certainty, but in some of Minot's cases improvement has been maintained for three and a half years and in none has relapse occurred so long as the liver diet was adhered to. It seems then that we have acquired a method of treatment infinitely superior to any previously in vogue and one which opens up possibilities of the solution of the ætiological problem and the attainment of a permanent cure.

Despite the success of liver feeding there are two supplementary therapeutic methods which we should for the present retain: the administration of dilute hydrochloric acid in large doses and of Fowler's solution. I would emphasize that it is possible to give large doses of acid, by which I mean four to six cubic centimetres (one to one and a half fluid drachms) thrice daily, only in the form of home made lemon or orange drinks; again and again this method has succeeded in patients who were unable to take smaller quantities in the ordinary mixture with syrup of lemon. Hurst's⁽¹⁸⁾ directions to patients are worth quoting:

Add two teaspoonfuls of the acid to about half a pint of water, to which the juice and pulp of an orange and some sugar have been added. This should be drunk, fasting, in the morning one hour before breakfast; the same quantity of the same strength should be taken as a beverage with lunch, and again with dinner. To the latter two a saltspoonful of pepsin should be added.

Lemon or other fruit juice can be substituted for orange for a change, or syrup of grenadine without the addition of sugar. A little wine can be added to the mixture. The simple addition of sugar without fruit juice is sufficient, but is generally less palatable. Barley water or cider may be substituted for orangeade or lemonade.

In order to prevent any deleterious action of the acid on the teeth, the mouth should be thoroughly washed as soon as possible with water, in which a little sodium bicarbonate may be dissolved. Alternatively, a second tumbler containing water should be provided at lunch and dinner, so that a small mouthful can be taken immediately to wash away the acid every time some of it has been drunk.

Arsenic, though its mode of action has never been elucidated, is often so valuable that it should, for the present at least, be retained as an auxiliary to liver feeding. It is best given in the form of Fowler's solution in simple mixture. The commencing dose is three minims and it should be increased by one minim every four days until the appearance of digestive disturbances indicates that the limit of tolerance has been reached. The dose is then lowered slightly and its administration continued for a long period. The saturation point must be very carefully watched for, as it may be rapidly followed by the occurrence of dermatitis

which, as I have found to my cost, is a distressing and obstinate complication. If arsenic given by mouth fails, it has in my experience been useless to persist with it as cacodylate subcutaneously or "Novarsenobillon" intravenously.

The success of liver feeding has permanently relegated splenectomy and repeated transfusion to the therapeutic limbo. Both these methods always struck me as inspired by desperation and by the desire at all costs to do something rather than by sound reasoning. Even their warmest advocates admitted that good results were to be expected of them only in patients with marked remissions and these, after all, were the patients most likely to improve temporarily without or in spite of treatment.

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SOME NOTES ON GLAUCOMA.¹

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A PECULIAR feature about some of the people who suffer with glaucoma is their failure to seek relief for the blindness which has been coming on for a long period of time.

A male patient, sixty years of age, complained of his sight failing for five years.

A second patient, aged fifty-eight, stated that his left eye had been completely blind for five years and that the vision of his right eye had been failing for some time, more during the three weeks before he came to me.

A third man, seventy years of age, said that his sight had been failing in the right eye for eight years and in the left eye for four years.

A man, aged sixty-seven, had had gradually increasing dimness of vision for two and a half years.

A fifth man, aged sixty-five, stated that his vision had been getting worse for nine months.

A sixth, aged sixty-three, complained that his left eye had been blind for four years and that his right had been paining him for three weeks.

The seventh patient, aged sixty-nine years, said that the sight of his left eye had been getting dim for twelve months and that of his right eye for four months.

Another patient, whose age was fifty-six, said that the sight of both eyes had been getting gradually worse for two years.

In four of the above patients one eye was completely blind and had been for a considerable period of time; it was only when the vision of the other eye began to fail, that they came for relief. It is a peculiar attitude of mind. Some think that a gradual loss of sight is one of the accompaniments of the onset of old age and they do not worry about it.

People often discover by accident that they are blind in one eye.

I remember one morning the London *Daily Mail* had one of its startling headings: "People Blind in One Eye and Unaware of It." Next day there were quite a number of people who came to Moorfields to consult about their one-eyed blindness of which, until the paragraph appeared in the *Daily Mail*, they were totally unaware.

The glaucomatous patients mentioned above were quite aware of their disability, but allowed the matter to rest.

In this connexion Elliot may be quoted.

Nor is it uncommon to find amongst uneducated people that the loss of the first eye passes unobserved and that the patient only becomes aware that he is losing his sight when the second eye has failed to such an extent as to interfere with the ordinary acts of life.

¹ Read at a meeting of the Ear, Nose and Throat Section of the South Australian Branch of the British Medical Association in August, 1927.

Erroneous Diagnosis.

I am frequently meeting with patients who have been under the care of opticians and in some cases of medical men who have failed to appreciate the condition and the patient's sight has been allowed to go from bad to worse. The commonest thing to find is that these people have been told that they are suffering from cataract. The lens in early old age reflects more light, giving it a milky appearance. To the unwary it has the appearance of a cataract.

In three months I examined no less than eight eyes which had been allowed to go blind, when an early operation would have avoided this result. The patients had been told by the optician or medical practitioner that they would have to go blind before the cataract was ripe and they came to the Out-patients' Department to have imaginary cataracts removed.

I am aware that this matter has been stressed, but the fault in diagnosis is still very frequent. Students of ophthalmology in Adelaide have it hammered into them never to diagnose a cataract except with an overhead light and mirror. I shall quote two recent cases.

The patient, a man aged sixty-three, went to see an optician five months before complaining of pain across the left eye. He was told that there was nothing the matter with the eyes as he could read letters. In a month's time he returned to the optician and it was found that he could not see at all with the left eye. He then went to see an eye specialist, who told him that his eye had gone beyond repair and the specialist sent him to the Adelaide Hospital for immediate operation on the right eye.

Another patient, aged fifty-nine, came to the hospital complaining of cataract in the left eye. The eye had been getting worse for the past twelve months. The vision on the right side was $\frac{6}{36}$ and on the left was reduced to hand movements. Three months before she had consulted an optician who refused to provide any glasses. Two weeks before operation she went to a medical man who told her that she had a cataract.

Age Incidence.

Of twenty-six patients with glaucoma three were between forty and fifty, seven between fifty and sixty, eleven between sixty and seventy, four between seventy and eighty and one between eighty and ninety.

The youngest patient I have operated on for primary glaucoma was forty-seven, the eldest eighty-seven.

Priestley Smith⁽²⁾ states that the incidence of glaucoma increases slowly at first, more rapidly later, in each decade until about the sixtieth year. Between sixty and seventy it is about as frequent as between fifty and sixty. After seventy the frequency diminishes.

Priestley Smith's figures have been confirmed by later observers.

In the above cases the number between sixty and seventy was much greater than in any other decade.

Sex Incidence.

Among the twenty-six patients twelve were males and fourteen were females. Priestley Smith's figures are 56.9% females, against 43.1% males.⁽³⁾

Weather.

About 50% of the attacks occurred in March, April, May and June.

Homatropine as an Aetiological Factor.

While I was in London I made a point of asking all the ophthalmic surgeons I met whether they had ever seen an attack of glaucoma induced by the installation of homatropine. One man stated that he had seen one case and the tension was promptly brought down by eserine. Elliot states that cocaine has caused hypertension in spite of its usual lowering tendency.

I think that the influence of homatropine in inducing hypertension must be very slight.

The Cupping in Glaucoma.

I saw a patient in whom the cupping went from senile to glaucomatous; the change took several months to effect.

In another patient I saw at Moorfields after an injury the glaucoma supervened and the eye was cupped in fourteen days.

Some Interesting Cases.

J.W., *atatis* seventy-one, a female, had had a pain in the right eye for three weeks. She was admitted to Elder Ward and operated on by trephining. The wound healed quickly and the eye was quiet, but on the sixth day after operation she suddenly collapsed and died. At the *post mortem* examination a considerable hæmorrhage in the peritoneal cavity due to a carcinoma of the pancreas eroding the vessels was found.

S.P., *atatis* sixty, a female, stated that five weeks before she was seen she had had sudden loss of sight in the right eye. There was glaucomatous cupping in both eyes. The vision of the left eye was $\frac{6}{60}$. The right eye was trephined. It was very difficult to operate on the patient as she was unable to look down. A trephine operation was performed and a small iridectomy was done. The eye was quiet until the seventh day, when the iris bulged through the trephine opening. Under general anaesthesia the flap was lifted and the iris excised. There was an immediate escape of vitreous; a small amount was cut off. A few hours later the vitreous came through the trephine opening and bulged open the flap and it was necessary later on to excise the eye. The left eye was operated on and gave a good result.

M.W., a female, was in bed following an operation for gangrene of the ileum and developed acute glaucoma in both eyes. As it was impossible for her to lie in the horizontal position, a posterior sclerotomy was done in each eye and gave decided relief. The patient, however, succumbed in a few days to her abdominal trouble.

Treatment.

My treatment in acute cases is general and consists in giving morphine and hot baths, purgation and hot fomentations of eserine. After the pain has subsided I operate. I trephine in all patients with both acute and chronic glaucoma with very satisfac-

tory results in all but very advanced conditions. In these nothing does any good except excision. In trephining I use a discission needle and following Colonel Wright, of Madras, I do not catch hold of the flap, but roll it down with a probe covered with cotton wool. The flap is closed with a single unknotted continuous suture. I use posterior sclerotomy in painful eyes and sometimes a filtering scar follows.

Excision.

H. Neame and Wajid Khan⁽⁴⁾ examined 402 glaucomatous eyes and found 4% of them to contain a sarcoma of the choroid and in all of them there was not the least suspicion of a new growth prior to the excision.

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DOCTOR WEBSTER'S WILES: THE TRAGEDY OF AN ONLY CHILD.

By F. KINGSLEY NORRIS, M.D.,
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WHEN Charles Dickens, on his first tour of America in 1842, visited the University of Cambridge, now known as Harvard, he was received by representatives of the Medical Faculty. He particularly noted Doctor Oliver Wendell Holmes, Professor of Anatomy and Physiology; he shook hands with Doctor Webster, Professor of Chemistry. In an account of this visit in "American Notes," Dickens recorded: "The professors at that university are gentlemen . . . and are without one exception that I can call to mind, men who would shed a grace upon and do honour to any society in the civilized world." Twenty-five years later in a letter to Lord Lytton he left a very different impression.

Those who know Taylor's "Principles and Practice of Medical Jurisprudence" will remember the strange and motley drawing on page 131, a reconstruction of a Doctor Parkman's skeleton. The living covering of the bones was equally bizarre and excited constant comment in the streets of Boston where Doctor Parkman was in active practice until Friday, November 23, 1849, when he completely and mysteriously disappeared. Parkman was an eccentric. He was always in a hurry; it was said that if his horse would not travel fast enough for him, he would get down, leave the animal in the middle of the street and hurry along on foot. A contemporary drawing from a Boston paper displays his long, thin body bent forwards from the hips, his arms clasped behind his back, his prognathic jaw thrust well forward, altogether an

aggressive, irritating type of man. On the fatal Friday Parkman left his home at 8 Walnut Street about midday to keep an appointment at the Medical College. On his way he called at the green-grocer's and ordered a lettuce, an expensive luxury at that season, as a delicacy for his invalid daughter. The lettuce was to be ready for him on his return in half an hour.

Lunch time came, but Parkman who was always a most punctilious person, failed to appear. Mrs. Parkman communicated with Doctor Webster at the College and was told that her husband had left more than an hour ago in his usual hurry. By the evening the disappearance was the talk of the town. The police were called in and on the Sunday handbills were posted throughout the streets. On Monday a reward was offered which was doubled within twenty-four hours, and brought forth an extraordinary letter addressed to Mr. Francis Tuckey, the Town Marshal.

Dr. Sir

You will find Dr. Parkman
Murdered on brooklynt heights. yours, M.
Captain of the Darts.

Next day the Marshal was favoured with:

Dr. Parkman was took
on Bord the ship herculum
and this is al I dare to say
as I shal be kild
Est Cambge, one of
the men
give me his watch
but I was feared to
keep it and throwd
it in the water rigt side
the road to the
Cam bige to
Bost.

A third, but this time a more literate letter, arrived:

Dear Sir,—I have been considerably interested in the affair of Dr. Parkman, and think I can recommend means, the adoption of which might result in bringing to light some of the mysteries connected with the disappearance of the afore-mentioned gentleman.

In the first place, with regard to the searching of houses, etc., I would recommend that particular attention be paid to the appearance of cellar floors; do they present the appearance of having been recently dug into and covered up again or might not the part of the cellar where he was buried have been covered by piling wood? Secondly, have the outhouses been carefully examined; have they been raked sufficiently? Probably his body was cut up and placed in a stout bag, containing heavy weights, and thrown off one of the bridges, perhaps Craigies. And I would recommend the firing of cannon from some of these bridges, and from various parts of the harbour and river, in order to cause the parts of the body to rise to the surface of the water. This, I think, will be the last resort, and it should be done effectually. And I recommend that the cellars of the houses in East Cambridge should be examined.

Yours respectfully,

CIVIS.

Rumours were rife as to Parkman being seen in the afternoon of his disappearance, but on investigation these were found to be without substance. Apparently from the moment he left Professor Webster at the Medical School Parkman had vanished into thin air. Let us now regard Professor

Webster or to give him his full titles, John White Webster, M.D., M.A., Ewing Professor of Chemistry and Mineralogy in Harvard University, Member of the Massachusetts Medical School, of the American Academy of Arts and Sciences, of the London Geological Society and of the St. Petersburg Mineralogical Society. The same paper that supplies a drawing of Dr. Parkman shows Webster to resemble very strongly that most poetical of composers, Franz Schubert. The same good forehead crowned by a thick mass of hair, the short, bushy side whiskers and weak eyes, peering through large rimmed glasses; a man of personality and charm. An only son of a successful druggist, he was the victim of well meaning, but over indulgent parents. Denied nothing in his youth, he failed to adjust his balance in later life and within a few years he ran through a patrimony of several thousands of pounds. He became a social leader, living on a most extravagant scale. His dinner parties at Cambridge, a suburb of Boston, were looked forward to with pleasure and back upon with satisfaction. His classes were always well attended—he was a brilliant lecturer—and, as was the custom at Harvard, he sold the seats in his lecture theatre and comfortably complemented his salary, but he lived constantly beyond his means and placed no rein on his expensive tastes and hobbies.

Doctor Parkman and Doctor Webster had been fellow students at the University; they graduated in the same year and to the recommendation of his friend Webster owed his position on the University staff. The debt was increased soon after the appointment by a considerable loan and within a few years a further five hundred pounds were raised by a mortgage on a unique and valuable collection of minerals. This carried Webster along for another year, but by 1848 his financial position was again tottering. This time he approached Parkman's brother-in-law, Mr. Shaw, who yielded two hundred and fifty pounds on the fraudulent security of his minerals which had already been mortgaged. How he ever hoped to straighten this tangle no one knows, but apparently it caused him no worry.

One morning Doctor Parkman and his brother-in-law passed Webster in the street. Shaw was always sympathetic towards the professor and commented on the meagre nature of his salary. "No wonder he had to mortgage his collection of minerals to me to increase his income." Parkman for once stopped in the street and stared at him, then, dragging Shaw by the arm, he took him home to Walnut Street and produced Webster's written statement granting all his property as security to Doctor Parkman. Shaw was a mild natured man and refused to act on the discovery of the fraud, but Parkman, strict in all his business dealings, rushed off to give Webster a piece of his mind. What happened at this interview is not known, but in some manner Parkman was placated by a promise to hand over the proceeds of the sale of lecture seats. Each quarter these were paid in advance, but when Webster next received the money he passed it on to another creditor. Parkman was furious and

insulted Webster most openly, saying he was "neither an honourable, honest, nor an upright man." He even went to the length of attending Webster's lectures and glaring at him from the front row. Only the remote possibility of getting some of his money back prevented Parkman from publicly exposing the fraud.

Webster could turn nowhere. Early on the morning of Friday, November 23, 1849, he called at Walnut Street and made an appointment for Parkman to call at the Medical School at 1.30 p.m. That day he received his ninety dollars from the lecture tickets and said to his agent, Mr. Pulter: "You will have no further trouble from Doctor Parkman; I am going to settle with him." And yet next day he paid the money into his own account at the Charles River Bank.

Webster put forward the suggestion that Parkman on his return had been waylaid and murdered for the sake of the hundreds of dollars he had just been repaid, as witness Parkman's note across the bills. But whence came this wealth? It seemed an impossibility to suspect the gentle professor of violence and the inspection of Webster's apartments on the Monday and Tuesday was rather formal and fruitless. This did not satisfy the janitor, Ephraim Littlefield, who was always unpopular with Webster. The week following the disappearance was Thanksgiving Week, with a practical cessation of lectures and Littlefield had ample time to prowl around.

Unable to get into Webster's rooms by legitimate means, as they were kept locked, he tackled a basement wall and soon cautiously removed enough bricks to allow him to crawl through into the space below Webster's privy. Portion of a pelvis and a human leg met his eyes. Satisfied, he hurried to the authorities.

That evening the Webster family circle was rudely broken by the intrusion of Mr. Clapp, a police officer, who asked the professor to accompany him in a waiting carriage to the Medical School, so that a further search could be made. Webster rose, bade his wife a perfunctory farewell, asking her to prepare supper against his return and stepped out with the officer. As he looked out of the carriage window he noticed that they were moving in the wrong direction and suddenly through the mist of a mental collapse he heard the announcement of his arrest. He was carried into the jail and formally charged with the wilful murder of Doctor Parkman, but strong stimulants were necessary before he was able to accompany a party to the Medical School where a more thorough search was carried out. Later the results of this investigation, a gruesome array of exhibits, lay before the court. After five months delay by a quip of fate on April 1 the Honourable Samuel Shaw presided over a bench of four judges. The whole case turned on the identification of the remains and it is of interest to review the medical evidence. A medical committee, consisting of Doctor Winslow Lewis, George H. Gay and James W. Stone, with James Andrews as secretary, had been directed to carry out a *post mortem* exam-

ination on the fragments of the body, from which the head, feet and hands were missing entirely, a circumstance exactly paralleled in the Waterloo Bridge mystery in London in 1857.

The medical committee reported: (i) The remains were those of a human male; (ii) as the parts corresponded without duplication they belonged to only one body; (iii) the condition of the skin and hair indicated late middle life; (iv) the ossification of the arteries suggested an age within ten years of sixty years; (v) the leg muscles were very well developed, suggesting much walking or similar exercise. The body was reconstructed from the fragments as follows:

Thoracic portion, length	17½ inches
Pervic portion, length	9¾ inches
Both thighs, same length	18 inches
Left leg to outer malleolus	16 inches
<hr/>	
Total	61 inches
Deduct distance from bottom of pelvis to top of acetabulum	3¾ inches
<hr/>	
	57½ inches
Add distance from sole of foot to outer malleolus in another subject	3 inches
Distance from top of head to seventh cervical vertebra in another subject	10 inches
<hr/>	
Total calculated length of body	70½ inches

Doctor Ainsworth, Demonstrator in Anatomy, gave evidence that his list of subjects for dissection tallied with his material; none was missing and he stated that although some of the remains indicated careless mutilation, the dissection of the sternum from the clavicles displayed some anatomical knowledge. Doctor Charles T. Jackson, a chemist, gave evidence of the finding of the action of caustic and heat on the remains, but could find no evidence of zinc or arsenic which were the usual preservatives then used in the preparation of anatomical subjects.

Now Parkman was sixty years of age and five feet eleven inches in stature, but the evidence so far by no means proved the identity of the remains. The next witness provided the keystone in a most remarkable manner.

Doctor Nathaniel Keep, surgeon dentist, stated that in 1846, three years previously, Doctor Parkman had consulted him; the visit was a few days before the inaugural ceremony held on the occasion of the opening of the new Medical School. Doctor Parkman, in a fit of generosity, had given the land for the site of the college and had been asked to take a prominent seat on the platform on the opening day. His vanity was tickled by the prospect of the references in the speeches to his beneficence and he felt it his duty to get together a few modest words in reply. Parkman was not given to public speaking, his main difficulty seems to have been with his false teeth, which did not fit very well, and at a critical moment were apt to fall out. For such an auspicious occasion he decided to adjust the trouble, hence his visit to Doctor Keep. The notice was very short and the plate rather intricate. Doctor Keep devoted a great deal of his time to the workmanship and well remembered the occasion.

Here the tension of the court was dramatically interrupted in consequence of an alarm of fire at the lodgings of the prosecuting counsel, who requested leave of absence to rescue his valuables. Fortunately the fire proved to be confined to an outhouse and the drama proceeded.

Doctor Keep had been handed the sweepings from the furnace in Webster's laboratory. Among these he recognized portions of teeth and jaw which when compared with his casts and notes absolutely corresponded. Holding these fragments dramatically up to the court he firmly stated: "I have as good reason to believe that these are Doctor Parkman's teeth as I have to believe any fact in my knowledge."

Mr. Noble, assistant to Doctor Keep, corroborated the evidence of dental identity and explained that the action of sudden heat on the artificial teeth would tend to produce an explosion and disruption, but the muffling of a flesh covering as by being burnt while still in the head would prevent this and would account for the integrity of the specimens.

Doctor Jeffries Wyman gave evidence of the finding of human blood stains on Webster's slippers and trousers. This was confirmed by Professor Oliver Wendell Holmes. Mr. Gould, handwriting expert, produced evidence that certainly the letter signed "Civis" and probably the letter signed "Dart," were in Webster's handwriting. This closed the case for the prosecution.

For the defence numerous witnesses came forward with evidence of the mild character of the prisoner. Two witnesses testified as to seeing Parkman after he left the Medical School, but this evidence did not withstand a severe cross-examination. Webster's family testified that throughout the Friday afternoon he remained at home. Doubts were cast on the identity of the remains and finally suspicion was directed towards Littlefield, who was known to have a grudge against Webster and who had first found the suspected remains. The case was closed by an impassioned address to the jury.

Upon you it devolves to say whether Professor Webster shall go hence to his family and there remain—what he has always been to them—the very centre of their purest and holiest affection, the very object of their idolatry, or whether he shall go hence to the scaffold, leaving to that family a name—a name to be ever deemed by them their great though their only disgrace.

Against the advice of his counsel Webster addressed the jury. He made a bare statement of his innocence and complained of the conduct of his case. Then calling God to witness, he proceeded to perjure himself.

The summing up of Mr. Justice Shaw was scrupulously fair, but at the end of three hours' deliberation the foreman, speaking with great distress, announced their verdict of guilty and the judge, in a lengthy and rather horribly emotional and censorious address, pronounced sentence of death.

It seemed almost an impossibility that the genial doctor, the popular society man, the cultured scientist could be guilty of such a crime; that the sentence would be carried out was almost unbeliev-

able. An appeal was at once lodged mainly on the grounds of wrong procedure. After due argument and consideration this was dismissed. Then Webster from his cell submitted a "confession."

Doctor Parkman came in answer to my invitation. I intended to beg for further time. Parkman came and heaped abuse on me, calling me liar and scoundrel and other bitter taunts and opprobrious epithets, with torrents of threats and invective "You see," he said, "I got you into your office and now I will get you out of it." I forgot everything. I felt nothing but the sting of his words. I was excited to the highest degrees of passion; in my frenzy I seized whatever was handiest—it was a stick of wood—and dealt him an instantaneous blow with all the force that passion could give. If I had intended homicide of Doctor Parkman I should not have made the appointment in so open a manner. As God is my witness, I never had the remotest idea of injuring Doctor Parkman until the moment when the blow was struck. I was an only child and much indulged. I have never secured the control over my passions that I ought to have acquired earlier and the consequence is—all this.

In view of this statement counsel argued that Webster could be guilty of manslaughter, but the evidence was strong that the deed was premeditated. The seclusion of the laboratory during Thanksgiving Week, the fuel that had been brought for the furnace in large quantity during the preceding days, the preparation of large volumes of caustic, the ordering of a quantity of blood from the hospital probably with a view to accounting for any blood stains. The Committee of Pardons reported that:

They could not, consistently with what they conceived to be their duty, recommend a commutation of the sentence. Standing as he does under sentence of death, his word should not outweigh the doings of the court and jury and rescue him from the consequences which are to follow their procedure.

All hope was past and Webster resigned himself to religious consolation, declaring the justice of his sentence. At 9.40 a.m. on April 30, before one hundred and fifty people, assembled in the prison yard, and crowds on the surrounding housetops, the sheriff caused the sentence of the court to be carried out on the body of John White Webster.

Some years later in a letter to Lord Lytton, Dickens wrote:

Being in Cambridge on my second American tour, I thought I would go over to the Medical School and see the exact localities where Professor Webster did that amazing murder, and worked so hard to rid himself of the body of the murdered man. (I find there is, of course, no rational doubt that the professor was always a secretly cruel man.) They were horribly grim, private, cold, and quiet. The identical furnace, smelling fearfully (some anatomical broth in it, I suppose), as if the body were still there, jars of pieces of sour mortality standing about, like the forty robbers in "Ali Baba" after being scalded to death.

Mudato o tempo, mudato o conselho.

THE INTRODUCTION OF INTRATRACHEAL CATHETERS.

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OF late years intratracheal anaesthesia has become extensively used for operations: (i) where blood escapes into the upper air passages; (ii) on

the lungs, when adhesions to the chest wall are not expected and a positive pressure is necessary to keep the lung inflated; (iii) suboccipital cerebellar operations, where kinking of the trachea occurs readily.

However, it still appears that practitioners, including some regularly giving these anaesthetics, still fail to grasp the principle of the method, namely, that when given properly, there is such a volume of air pumped into the patient that there is a draught ascending in the trachea alongside the catheter even during inspiration. When this condition is fulfilled, the mouth, nose and pharynx can be filled with liquid without any being inspired. As indicated previously,⁽¹⁾ it is only possible to be certain that enough air is being pumped into the patient (unless a gross excess is used) if my negative pressure tambour or some similar indicator is used.

Probably, intratracheal anaesthesia would be used even more extensively if it were not for the slight trouble and difficulty connected with the introduction of the catheter.

From the early days of the method it has been usual to pass the catheter under direct vision by means of some form of laryngeal spatula, usually the Jackson laryngoscope.

Even in a well equipped, well staffed theatre there are the following objections to this method:

1. At least a short time is lost in altering the patient's position for this manoeuvre.
 2. A few patients have too rigid necks or their larynges are too far forwards for introduction by this method to be possible.
 3. If the surgeon is not an oto-rhino-laryngologist and the anaesthetist has not had special experience, some trauma may be produced by the instrument.
- In a poorly equipped or poorly staffed theatre, there are the following further objections to this method:

1. Nurses or attendants have to leave their usual duties in the theatre to support the head *et cetera*.
2. They rarely perform these duties efficiently.
3. Care of the Jackson lights, cords, batteries, means constant supervision. If the attendant is not used to them, he may waste half an hour whilst the light flickers, if it condescends to light at all and during which time the lamps, cords *et cetera* are changed numerous times without success. In the end the surgeon may have to remove his gloves, find the fault himself and then have to reprepare himself for the operation.

In the near future an intratracheal anaesthetic machine will be part of the equipment of every general hospital and it is obvious that in many of the poorly staffed ones the theatre personnel will constantly cause annoyance and delay with electric failures with laryngoscopes.

Two years ago a series of such episodes culminated in three-quarters of an hour of intense irritation of waiting for the light, at the end of this period it was found that all spare laryngoscope bulbs in the hospital had previously been burnt out

and I cast about for an alternate method of introduction. Dr. A. Ostinga who was giving the anaesthetic, suggested that digital introduction might be possible. This I tried and found quite easy. Since then this method has continued to be used exclusively at the Newcastle General Hospital, though the inefficient theatre staff has long since been replaced.

Digital introduction has many advantages:

1. It is easily learnt by anyone with an average length of finger.
2. It is very quickly executed.
3. It entails no gross movement of the patient.
4. No trauma can be produced by the unskilled unless quite unjustifiable force be used.
5. With skill and a moderate length of finger larynges can be intubated, when the direct vision method would fail altogether.
6. Where a small hospital instals an intratracheal anaesthetic set, the expense of laryngoscopes, cords, batteries *et cetera* need not be added.

The following disadvantages may be urged:

1. The catheters cannot be inserted in every case with certainty by a person with short fingers. However, if both surgeon and anaesthetist are used to the method, failures should be rare.
2. The catheter is passed through the far from aseptic pharynx into the sterile air passages below and this, some might allege, would set up complications. The risk, however, is very small, less, in fact, than the risks of pneumonia after an ordinary general anaesthetic. With general anaesthesia, given by other methods, pharyngeal secretions are freely inspired into the trachea, whilst with intratracheal anaesthesia no pharyngeal secretions are inspired once the catheter is inserted and the pumps connected. This statement can be verified by anyone who wishes to do so examining the trachea with a bronchoscope at the end of a general anaesthetic. In spite of this post-anaesthetic pneumonia is, at any rate in Australia, sufficiently rare to be practically a nonentity, even after general anaesthesia. Further, the method here described has now been used in 178 cases at the Newcastle General Hospital and in 189 cases in private practice without any pulmonary complications ensuing.

The details of introducing the catheter are as follows. The surgeon stands on the right of the patient who lies flat on his back. After the patient has been fully anaesthetized, a gag is inserted. The surgeon introduces the index and middle fingers of the left hand into the pharynx and feels for the epiglottis. If, as often happens, the epiglottis folds on itself, it may be impossible to reach its tip to straighten it. If this occurs, a finger is passed down one side of the pharynx as far as it will go, and while it is being pressed anteriorly against the tongue, it is brought to the mid-line. This uncurls the epiglottis which is then secured and held forwards against the base of the tongue with the left middle finger until the end of the procedure. While the manipulation is being performed, it is

an incalculable advantage for the head to be fully extended. This must be done without lifting it and the best way to describe how to do this is to ask an assistant or the anaesthetist to push the occiput under the patient. If one has any difficulty in securing the epiglottis, one seizes the larynx between the right finger and thumb at the level of the cricoid and pushes it up into the pharynx. The catheter, from the lumen of which excess water has been shaken, is taken and introduced under cover of the left index finger which has not yet been withdrawn from the mouth. This finger guides it in the mid-line and keeps it closely applied to the posterior surface of the epiglottis until it has passed well into the trachea. The left index finger then feels for the arytenoid cartilages, which are found as two firm knob-like bodies side by side in the mid-line. If these are felt posterior to the catheter, it is absolutely certain that introduction has been correctly performed. Often, however, the arytenoids are situated out of reach, even if the larynx be raised as described. The other signs of successful introduction (type of phonation, good rush of air through catheter *et cetera*) have then to be used.

At this juncture it would be as well to warn the inexperienced that a little air may be sucked in and out of a catheter when a patient strains if it has been accidentally introduced into the oesophagus, for the thoracic oesophagus normally contains air.

Rarely introduction is not easy owing to it being impossible more than just to secure the tip of the epiglottis. In these cases the introduction can be facilitated by placing a stilette in the catheter and bending it at right angles ten centimetres (four inches) from the end. The epiglottis is held forwards as described, whilst the tip of the catheter is passed down by touch along the posterior surface of the epiglottis. After it has reached the inside of the larynx, the stilette is withdrawn, but it is most exceptional to have to use a stilette.

Since this technique has been fully evolved and put into regular use, it has been found that digital catheter intubation has been used before for preventing tracheal collapse in thyreoid operations, but no information has been gleaned of its having been used regularly for intratracheal anaesthesia, though it is unlikely that its use for such a purpose is new. However, it has given such satisfaction that it is in order to recommend its general adoption that this description is given.

Reference.

- ⁽¹⁾ A. B. Keith Watkins: "The Principles of Intratracheal Anaesthesia," THE MEDICAL JOURNAL OF AUSTRALIA, July 19, 1926, page 48.

BLOOD TRANSFUSION OF INFANTS.

By G. J. LILLIE, M.B., B.S. (Melbourne),
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THE purpose of this paper is to make a summary of blood transfusions given to babies (under the age of two) during the last two years in the medical

wards of the Children's Hospital, Melbourne. The details are set out in the accompanying table.

Groups.	Number of Patients Treated.	Number of Patients Cured.	Number of Deaths.
Malnutrition	18	8	10
Gastro-enteritis	9	5	4
Infective colitis (including dysentery) ...	5	2	3
Pneumonia	2	1	1
Anæmia (of various ætiology)	2	0	2
Ludwig's angina	1	0	1
Congenital malformation of bile ducts ...	1	0	1
Hæmatemesis	1	0	1
Melena	1	1	0
TOTAL	40	17	23

In all cases except one the blood was given intravenously. The intraperitoneal method has been practised by many authorities with some success.⁽¹⁾ We, however, have not tried that and other methods, except the intravenous.

At the outset, two years ago, transfusions were often given as a last resort. During the last six months we have been doing them earlier under more or less definite indications and we hope in future to show better results.

Description of the Groups.

Of the groups in this series, the first three are the most important and interesting.

Malnutrition Group.

Included in the malnutrition group are all the dietetic disturbances. The number transfused in this group was eighteen. Eight definitely were benefited. There were ten deaths; the majority were due to broncho-pneumonia.

In those patients classed as cured, we found that some did not immediately respond after the transfusion. Their general condition and appearance were improved, but their weight remained stationary for a week or two before they commenced to gain. In some cases we gave a second transfusion two or three weeks after the first. It was not till the second transfusion that they commenced to gain in weight.

Our conclusion in this type of malnutrition is that transfusion often decidedly helps those babies who, despite careful dietetic treatment, either persistently lose weight or remain stationary. The transfusion should not be delayed too long. Of course all constitutional diseases, such as syphilis, tuberculosis *et cetera*, are first excluded.

Gastro-Enteritis.

In the gastro-enteritis group are included all the cases of diarrhœa and vomiting. The number of patients transfused was nine, four of whom showed a distinct benefit. One patient is still in hospital and has been improving slowly since the date of the transfusion. The majority of those that died, succumbed within a few days of the transfusion and the transfusion produced no immediate benefit. We feel that these cases of diarrhœa and vomiting persist after routine treatment,

such as dietetic intraperitoneal saline solution *et cetera*.

Infective Colitis.

In the infective colitis group are included the dysenteries. These patients should not be left till they are moribund.

There are more or less two definite indications:

1. If at the onset the child is extremely "toxic" and dehydrated.

2. If at the end of two or three weeks the child is still "toxic," passing blood and mucus and steadily losing weight. Some authorities recommend bleeding before transfusion. We have not done that.

Blood Typing.

Latterly in all cases we have been carrying out direct cross typing of the donor's and the recipient's blood both ways, that is the donor's corpuscles have been typed against the recipient's serum and the recipient's corpuscles against the donor's serum. We have not been group typing them or using a universal donor as is done with adults. We found in some cases that while the donor's corpuscles would be compatible with the recipient's serum, the recipient's corpuscles would be incompatible with the donor's serum. There has been much argument as to whether this double cross typing is necessary.

Operation.

One assistant and two nurses are necessary for the operation. The assistant procures the blood from the donor in the usual manner. One nurse is needed to hold the child and the other to assist. The instruments necessary are: hypodermic syringe, scalpel, forceps and artery forceps, aneurysm needle, small curved metal cannula about one-eighth of an inch in diameter to which can be attached a "Record" syringe, two thirty cubic centimetre "Record" syringes, graduated glass flask and stirrer, fine pointed scissors, sodium citrate solution, 3-8%.

The donor's blood is taken from the median basilic vein in the usual manner and run into citrate solution, sixty-four cubic centimetres to five hundred and sixty-eight cubic centimetres (two and a quarter ounces to the pint) of blood. The amount of blood taken is fifteen cubic centimetres per 0.45 kilogram (one pound) of body weight of the child, as recommended by Unger.⁽²⁾ At first we gave far too much blood; this probably accounted for our poor results. The blood is kept warm and continually stirred.

Site.—In most cases we have used the internal malleolar vein. If this is found to be too small for insertion of the cannula, we used the saphenous vein. The objection to this, of course, is that the wound is in the napkin area. The internal malleolar vein is usually not visible externally. The leg of the baby is held by a nurse, one hand above the knee and the other at the heel. An incision is made

about five centimetres (two inches) long in the line of the internal malleolar vein in front of the malleolus, after first anæsthetizing with 2% "Novocaine" solution. The vein is found lying on the deep fascia and should be dissected cleanly throughout the whole length of the incision. The vein is not large, about the size of a coarse thread in diameter. It is rendered more prominent by the nurse holding the child, squeezing the thigh. When the vein is dissected cleanly it is completely tied with catgut at the most distal part of the vein. The ends of the catgut are left long for traction. An incomplete tie is made about the middle of the vein. The vein is incised laterally with fine pointed scissors into the lumen. This is made easier by the nurse squeezing the thigh and so distending the vein. The incision should be made with one cut only, otherwise the edges become jagged and there is difficulty in inserting the cannula into the lumen. The curved metal cannula is then inserted through the slit made into the lumen for about 1.25 centimetres (one-half inch) and tied firmly in by the incomplete tie. The cannula may slip up between the inner and outer coats of the vein. Having inserted the cannula and tied it in firmly, the operator holds it in his left hand which steadies it until the transfusion is finished. The assistant hands him a "Record" syringe full of citrated blood which the operator inserts into the end of the cannula and holds there with his right hand. The assistant then slowly forces the blood into the vein. We do not worry about the small amount of air in the cannula in the beginning. The blood should be given slowly, about three to five minutes per thirty cubic centimetres of blood. When the syringe is nearly empty, it is disconnected by the operator. The assistant then hands him a fresh syringe of blood. Meantime the other syringe is disconnected and placed in citrate solution 3.8%.

This process continues until the requisite amount of blood is given. If the blood is given too quickly, collapse is likely to occur. The child should, therefore, be watched. The cannula is removed when sufficient blood is given. The vein is tied and the wound sutured with horsehair.

Conclusions.

The results, though not startling, are an improvement on the death rate before we commenced to transfuse. We feel that in many cases transfusion was done as a last resort and for the need of doing something. We, nevertheless, believe that in many cases if transfusion had not been done, the child would most certainly have died. With our past experience we hope in future to be able to lower the high mortality of the large groups of infantile diseases, namely, inanition, diarrhoea and vomiting and infective colitis.

Acknowledgements.

I wish to acknowledge the kind advice of Dr. R. L. Forsyth and Dr. J. W. Grieve in regard to the preparation of this paper.

References.

- (1) E. H. M. Stephens: "Last Season's Gastro-Enteritis," THE MEDICAL JOURNAL OF AUSTRALIA, February 13, 1926, page 182.
- (2) D. W. Hill: *Archives of Pediatrics*, 1926.
- (3) Unger: *Archives of Pediatrics*, 1925.

Reports of Cases.

A PYOGENIC VERRUCOSE DERMATITIS.

By NORMAN PAUL, M.B., Ch.M.

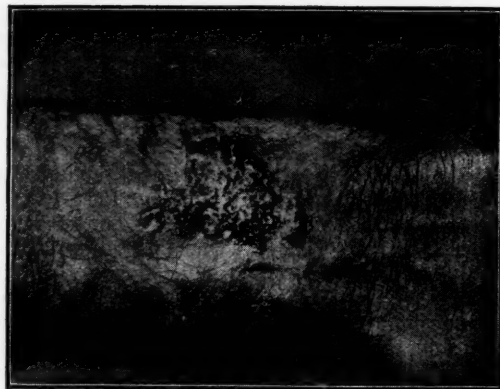
Honorary Dermatologist, Royal Alexandra Hospital for Children; Honorary Assistant Dermatologist, Sydney Hospital.

OCCASIONALLY or rather rarely one sees a localized verrucose condition of the skin studded with cribriform openings which exude or on pressure exude pus. It is a clinical picture which perhaps somewhat resembles that of blastomycosis. I have, however, never obtained yeast from these cases and I have never yet seen in this country a case of blastomycosis. The lesions may be single or multiple and generally occur on exposed parts, such as the dorsum of the hands or forearm. The history usually given is that of some slight trauma or injury to the skin. This is followed by a raised circumscribed inflammatory area which soon exudes pus from numerous minute openings. Then follows the typical lesion constituting a distinct entity; it is apparent as a localized area composed of verrucose or hyperplastic epidermal tags between which pus can be made to exude.

A patient with lesions having features as above recently presented himself and the following concise notes were sent by the medical practitioner with him.

Mr. —, whom I first saw on September 4 for an abscess in the right upper arm and an acute lymphangitis arising from a small septic abrasion of the skin on the dorsum of the right wrist. I opened the abscess, fomented the abrasion and the lymphangitis quietened down and when I last saw him at that time the abrasion had almost healed. I next saw him on October 19 when the hand presented much the same appearance as now, but was not so extensive. From the many small sinuses serum exuded, but I could not find any organisms. Thinking the cause was some septic condition, I ordered dressing of 1 in 1,000 "Acriflavine" and in about two to three weeks (so he tells me) the lesion healed and the skin looked normal and remained so for two or three days, when it suddenly flared up again, rapidly increased in size and began to ooze serum.

On examination, F.A.G., a painter, middle aged, had the following lesions of the skin as seen in the accompanying figure.



1. A circumscribed area on the dorsum of the wrist that had been present for two or three months. It had a verrucose appearance and cribriform openings, from which pus earlier exuded, but now is only obtained on pressure. It is extending down the forearm, where there are to be noticed minute white areas around the hair follicles, a pustular folliculitis.

2. A raised inflammatory patch on the ulnar surface of the wrist, of three days' duration. There is some serous exudation on the surface.

3. An inflammatory slightly raised patch on the opposite side of the wrist.

The Pathological Report.

Dr. Marjory Little carried out a bacteriological examination. Smears of the pus were found to contain a few pus cells, some Gram-positive cocci (staphylococci), streptococci and a few Gram-negative bacilli. On culture *Staphylococcus pyogenes aureus* and streptococci were obtained. Another culture later yielded the same organisms.

In a consideration of the lesions produced by these organisms, it is necessary to remember that streptococci in the skin produce a serofibrinous exudation, they attract serum, whilst staphylococci attract leucocytes. The original lesion in the case under consideration started from some slight trauma and was followed by lymphangitis, doubtless an infection of streptococcal origin. The more recent lesions appear as acute raised inflammatory patches, also suggestive of streptococcal infection. In a later phase there were small pustules starting around the hair follicles, suggesting a staphylococcal infection, whilst from the cribriform openings of the warty plaque both streptococci and staphylococci were obtained. It would thus appear that the causative organism is a streptococcus, but that the staphylococcus may be necessary for the production of the verrucose lesion, playing the same rôle as it is supposed to take in the production of such warty conditions as *tuberculosis verrucosa cutis* and allied conditions, some of which have recently been described under the title of vegetating papillomata. Sections were not obtained from the skin of my patient. However, I have in mind a similar type of lesion which I sectioned many years ago and which consisted of definite epithelial hyperplasia and minute intraepithelial abscesses.

The sequence of events is evidently an acute infection of the skin, followed by multiple minute abscesses which soon appear at numerous points on the inflammatory plaque. These abscesses proportionately produce a good deal of destruction, so that between their cribriform openings are to be seen hyperplastic epidermal tags, giving the verrucose condition to the lesion. These tags later through interference with their nutritive supply slough, leaving either a smooth surface or one with some scarring, even of a keloidal nature.

On several previous occasions I have obtained similar organisms from these warty lesions and have regarded them as of streptococcal origin.

Chalmers and Archibald record two cases of streptococcal dermatitis⁽¹⁾ occurring in the Sudan, with a similar clinical picture to the case under consideration. They advocate a streptococcal vaccine which was effective in their patients.

Local treatment should be on the lines of that given for deep cutaneous streptococcal infections, such as erysipelas.

Reference.

⁽¹⁾ Chalmers and Archibald, *Journal of Tropical Medicine and Hygiene*, July 15, 1918.

A CASE OF COLLOID MILIUM.

By A. C. ARNOLD, M.B.,

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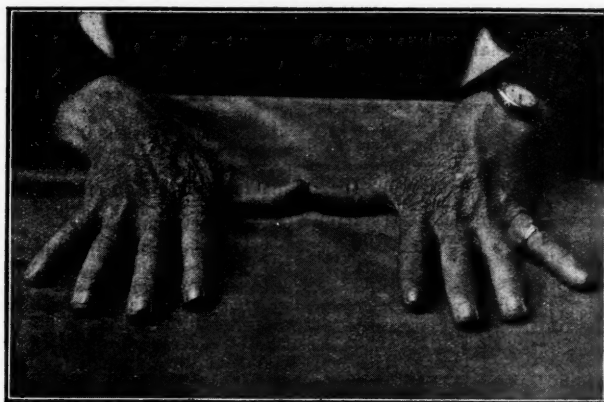


FIGURE 1.—Showing Lesion in Dr. Arnold's Patient.

THE following case is of interest because of its comparative rarity and on account of one or two unusual features. It was referred to me by Dr. Kesteven, Bullahdelah.

T. J. McG., twenty-nine years, grazier, complained of rash on the hands gradually spreading during the course of four years. His previous history contained nothing of interest. His present health and all his functions are normal. The present condition started on the second knuckle of the left hand and gradually spread over the back of the hand and thence to the right hand.

The first appearance was that of an acute vesicular erythema on which weak iodine had been painted and was wearing off; that is to say there was an indefinite yellow tinge.

The apparent vesicles were, however, semisolid and some slightly umbilicated; in one or two places they had degenerated, forming a warty papule.

On opening one or two a semicrystalline substance looking like recently fractured camphor could be expressed. There was no pain, but any blow on the affected part produced an ecchymosis giving an appearance like a raspberry. There was one present, but the photograph does not show it up. Figure 1 gives a good idea of the general appearance. The whole condition corresponds to that of colloid milium.

In the literature reference is made to yellow patches on mucous membranes and conjunctivæ; there is no appearance of these in this case.

Reviews.

BACTERIOLOGY.

DR. WILLIAM W. FORD'S "Textbook of Bacteriology" is divided into six parts: I. General Bacteriology, II. Systematic Bacteriology, III. Distribution of Bacteria, IV. Infection and Immunity, V. The Spirochaetes, VI. Infectious Microorganisms of Undetermined Character. More than half of the book is devoted to systematic bacteriology and this is the most original and most important part of the book. As the author indicates in his preface, he has depended largely on the selection of material from various sources and on personal observation on the study of this material over a period of many years in compiling this section. Whenever possible the original statements of the authors who established the species, have been followed. There is much material here that cannot be found outside of the original publications.

Especial emphasis has been laid on the description of pathogenic organisms responsible for disease in man and animals, but many organisms are described in detail which authors of other textbooks do not mention, many of them rare, but others very common. The classification suggested by the Society of American Bacteriologists has been adopted with some additions. The author, however, is wisely conservative in making no attempt to change all

¹ "Textbook of Bacteriology," by William W. Ford, M.D.; 1927. Philadelphia: W. B. Saunders Company; Melbourne: James Little. Royal 8vo., pp. 1069, with illustrations. Price: 42s. 6d. net.

the names now in common use for the different genera and species.

The part dealing with the spirochaetes is excellent and contains a wealth of detail. The section on infectious microorganisms of undetermined character is less full, but contains a very valuable summary of our present knowledge.

In the section devoted to general bacteriology the methods and technique of bacteriology are concisely described. This book is much more than a textbook of practical bacteriology; it is as a reference textbook that it will be most useful.

The book is illustrated by many excellent free-hand drawings of the various microorganisms dealt with. The variation in morphology which is so common, receives more attention than is usual in textbooks on bacteriology.

Throughout the book there are abundant references to the literature. It is a distinctive and original book, but it is one more for the advanced student in bacteriology than for the ordinary medical student. Every bacteriological laboratory should have at least one copy in its library.

OSLER'S MEDICINE.

THE most notable chapters in Volume V of the new Osler's Modern Medicine¹ are without doubt those supplied by James P. O'Hare, Associate in Medicine in the Peter Bent Brigham Hospital, Boston. Abandoning the time honoured division of the non-suppurative inflammations of the kidney into acute, chronic, parenchymatous and interstitial nephritis, O'Hare has embarked upon a serious attempt to unravel some of the problems that have hitherto rendered it so difficult to classify and differentiate the various conditions that are liable to terminate sooner or later in failure of renal function. The fact that the degree of glomerular, tubular, interstitial and degenerative change tends to vary so greatly in each individual case renders the task of classification almost Herculean, but the writer has risen to the occasion and produced a really excellent working hypothesis which should be of immense value to the thoughtful practitioner who so frequently finds that the kidney condition of his patients does not conform to any of the older types.

So great has been the recent progress in our understanding of renal disease, that the "Introduction to Diseases of the Kidney," by the late John McCrae, has been largely rewritten by Leonard Rowntree, himself responsible for much of the progress. The reader will find this article, especially the section under the heading "Important Advances of the Last Decade in our Knowledge of Diseases of the Kidney," complementary to O'Hare's classification and if he has not been keeping in touch with recent writings on this subject, he will be surprised to find how far modern methods of determining renal function are ahead of the simple quest for albumin and casts of only a few years ago.

The volume opens with an account of the diseases of the blood; the chapter on the "General Pathology of the Blood Forming Organs," by Richard Cabot, is fully up to the standard that would be expected from such an authority, but his further contribution on "Pernicious and Secondary Anæmia, Chlorosis, Leuchæmia and Polycythæmia" is not quite so satisfying. There is a little tendency to the *ipse dixit* style which leads to rather undue brevity with elimination of the grounds leading to deductions. Polycythæmia may be quoted as an example, this by no means rare disease being dismissed in just over two pages of which six lines are devoted to diagnosis and eight to treatment. Under the latter heading no reference is made to the use of benzol and phenylhydrazine, both of which have recently received considerable attention in American medical literature. While ready to accept Cabot's opinion that these drugs are valueless, we should like to know his reasons.

¹ "Modern Medicine: Its Theory and Practice," edited by Sir William Osler, Bart., M.D., F.R.S., Re-edited by Thomas McCrae, M.D., Assisted by Elmer H. Funk, M.D.; Volume V: Diseases of the Blood *et cetera*; 1927. Philadelphia: Lea and Febiger; Sydney: Angus and Robertson, Limited. Royal 8vo., pp. 948, with illustrations. Price \$9.00 net.

Purpura and hæmophilia are very lucidly dealt with by Joseph Pratt and an equally excellent article is supplied by Krumhaar on "Diseases of the Spleen."

Hodgkin's disease has received so much attention and investigation since Warfield Longcope contributed the then standard article on this disease to the 1909 edition that he has had almost entirely to rewrite it. The new account is a masterpiece in which the protean aspects of this remarkable disease are admirably portrayed.

A comparison of the accounts of the disease of the ductless glands in the present and the last edition brings home to us how great have been the additions to our knowledge of the endocrine system. George Dock has associated with him H. Lissner in the authorship of the new essay, which we have read with great pleasure and profit. It is interesting to note that these writers draw no hard and fast distinction between exophthalmic goitre and toxic adenoma, regarding them as merely clinical variations of a single morbid state.

The thymus has in this edition been included among the ductless glands and the pages devoted to thymic enlargement and *status lymphaticus* are specially noteworthy. We were surprised, however, to find no reference to cerebral hæmorrhage in the section dealing with the mystery surrounding thymic death. This accident, resulting from the hypoplastic state of the vascular system so often associated with the thymic state, has now been recorded quite often in these cases of sudden death. Indeed it would be interesting to know in what proportion of such cases a full examination of the brain has been made.

Among other valuable contributions should be mentioned those dealing with Raynaud's disease and scleroderma, though both serve to bring home to us our lamentable lack of knowledge of the ætiology and in consequence of any rational treatment of these distressing maladies.

PSYCHOLOGY.

IN "Studies in Psychology," by Dr. William Elder, we see a return to a common sense explanation of the problems of psychology which for the last decade seemed to have fallen into the hands of the psycho-analysts with their unlimited theories and Greek conglomerates in lieu of plain English words.¹

The author is against the materialistic explanation of life and mental phenomena and regards them both as being riddles unsolved. In spite of this, however, he discusses and explains in clear language and reasonable argument the mechanism of the nervous system and the various mental processes of will, emotion, consciousness, dreams, somnambulism and hypnotic states. The synapses and the influence of the *thalamus* are discussed in regard to their importance in the functioning of the brain as the seat of the mind. Apparently Dr. Elder can appreciate how impulses along motor nerves can make muscles move and impulses along sensory nerves and tracts can produce sensations, but he is against the idea that consciousness can arise from physico-chemical forces. His criticism of the method of dream interpretation by the psychoanalysts would convince anybody but a fanatic that the claims of the followers of that school of thought are unwarranted. Dr. Elder points out that Rivers believed that the dream was a solution of a mental conflict, Freud that it was the fulfilment of a wish, Adler that it was a desire to dominate and so on and says that as Freud stated that dream interpretation is the *via regia* to the knowledge of the unconscious in the psychic life, we can judge as to whether this important method of the psychoanalyst can be relied on as of any scientific value. The book will be useful to those specializing in psychiatry and to the general practitioner. Were it not for the technical nature of parts of the subject the book would be welcomed as a pronouncement of facts by the laity who are confused by the mystic trend of some of the educated members of our race.

¹ "Studies in Psychology," by William Elder, M.D., F.R.C.P.E., F.R.S.E.; 1927. London: William Heinemann (Medical Books) Limited. Demy 8vo., pp. 226. Price: 8s. 6d. net.

The Medical Journal of Australia

SATURDAY, FEBRUARY 25, 1928.

The Branches and the Journal.

THERE appears to be a certain amount of confusion in the minds of many individual members of the several Branches of the British Medical Association in Australia in regard to the relationship between the Branches and THE MEDICAL JOURNAL OF AUSTRALIA. It is scarcely surprising that a clear conception of the state of affairs is lacking, since the constitution of the British Medical Association and that of the Australasian Medical Publishing Company, Limited, are understood by few outside the executive bodies. The matter concerns each member of the Branches in Australia and it may be advantageous if the facts are explained.

In 1847 an organization was formed within the medical profession in the Colony of New South Wales called the Port Phillip Medical Association. This association published its official organ, the *Australian Medical Journal*. The life of the journal was a short one; it lasted for twelve months. The second official organ of a medical association was also called the *Australian Medical Journal*. It was published in Victoria from the year 1854 and became the official organ and property of the Medical Society of Victoria. In the year 1880 the New South Wales Branch, the Victorian Branch and the South Australian Branch of the British Medical Association were formed and recognized by the parent association. At that time the only medical journal in Australia that had survived was the *Australian Medical Journal*. In 1881 Ludwig Bruck founded a journal called the *Australasian Medical Gazette* which was described as the official organ of the New South Wales, Victorian and South Australian Branches of the British Medical Association. The Victorian Branch was at that time not a strong body. The majority of the medical practitioners in the State of Victoria were members of the Medical Society of Victoria which owned the *Australian Medical Journal*. This journal absorbed the *Inter-*

colonial Quarterly Journal of Medicine and Surgery in 1896 and changed its name to the *Intercolonial Medical Journal of Australasia*. The amalgamation between the Medical Society of Victoria and the Victorian Branch of the British Medical Association was effected about the year 1908 and in 1910 the journal that later became the official organ of the Victorian Branch as well as of the Medical Society of Victoria again adopted the name *Australian Medical Journal*. In 1895 the New South Wales Branch bought the *Australasian Medical Gazette* from Bruck and from that time this journal served as the official organ of the New South Wales, South Australian and Queensland Branches of the British Medical Association. The Western Australian Branch was recognized in 1899 and the Tasmanian Branch in 1911. The *Australasian Medical Gazette* became the official organ of these bodies from the time of their initiation.

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the names now in common use for the different genera and species.

The part dealing with the spirochaetes is excellent and contains a wealth of detail. The section on infectious microorganisms of undetermined character is less full, but contains a very valuable summary of our present knowledge.

In the section devoted to general bacteriology the methods and technique of bacteriology are concisely described. This book is much more than a textbook of practical bacteriology; it is as a reference textbook that it will be most useful.

The book is illustrated by many excellent free-hand drawings of the various microorganisms dealt with. The variation in morphology which is so common, receives more attention than is usual in textbooks on bacteriology.

Throughout the book there are abundant references to the literature. It is a distinctive and original book, but it is one more for the advanced student in bacteriology than for the ordinary medical student. Every bacteriological laboratory should have at least one copy in its library.

OSLER'S MEDICINE.

THE most notable chapters in Volume V of the new Osler's Modern Medicine¹ are without doubt those supplied by James P. O'Hare, Associate in Medicine in the Peter Bent Brigham Hospital, Boston. Abandoning the time honoured division of the non-suppurative inflammations of the kidney into acute, chronic, parenchymatous and interstitial nephritis, O'Hare has embarked upon a serious attempt to unravel some of the problems that have hitherto rendered it so difficult to classify and differentiate the various conditions that are liable to terminate sooner or later in failure of renal function. The fact that the degree of glomerular, tubular, interstitial and degenerative change tends to vary so greatly in each individual case renders the task of classification almost Herculean, but the writer has risen to the occasion and produced a really excellent working hypothesis which should be of immense value to the thoughtful practitioner who so frequently finds that the kidney condition of his patients does not conform to any of the older types.

So great has been the recent progress in our understanding of renal disease, that the "Introduction to Diseases of the Kidney," by the late John McCrae, has been largely rewritten by Leonard Rowntree, himself responsible for much of the progress. The reader will find this article, especially the section under the heading "Important Advances of the Last Decade in our Knowledge of Diseases of the Kidney," complementary to O'Hare's classification and if he has not been keeping in touch with recent writings on this subject, he will be surprised to find how far modern methods of determining renal function are ahead of the simple quest for albumin and casts of only a few years ago.

The volume opens with an account of the diseases of the blood; the chapter on the "General Pathology of the Blood Forming Organs," by Richard Cabot, is fully up to the standard that would be expected from such an authority, but his further contribution on "Pernicious and Secondary Anæmia, Chlorosis, Leucæmia and Polycythæmia" is not quite so satisfying. There is a little tendency to the *ipse dixit* style which leads to rather undue brevity with elimination of the grounds leading to deductions. Polycythæmia may be quoted as an example, this by no means rare disease being dismissed in just over two pages of which six lines are devoted to diagnosis and eight to treatment. Under the latter heading no reference is made to the use of benzol and phenylhydrazine, both of which have recently received considerable attention in American medical literature. While ready to accept Cabot's opinion that these drugs are valueless, we should like to know his reasons.

¹ "Modern Medicine: Its Theory and Practice," edited by Sir William Osler, Bart., M.D., F.R.S., Re-edited by Thomas McCrae, M.D., Assisted by Elmer H. Funk, M.D.; Volume V: Diseases of the Blood et cetera; 1927. Philadelphia: Lea and Febiger; Sydney: Angus and Robertson, Limited. Royal 8vo., pp. 948, with illustrations. Price \$9.00 net.

Purpura and hæmophilia are very lucidly dealt with by Joseph Pratt and an equally excellent article is supplied by Krumhaar on "Diseases of the Spleen."

Hodgkin's disease has received so much attention and investigation since Warfield Longcope contributed the then standard article on this disease to the 1909 edition that he has had almost entirely to rewrite it. The new account is a masterpiece in which the protean aspects of this remarkable disease are admirably portrayed.

A comparison of the accounts of the disease of the ductless glands in the present and the last edition brings home to us how great have been the additions to our knowledge of the endocrine system. George Dock has associated with him H. Lissner in the authorship of the new essay, which we have read with great pleasure and profit. It is interesting to note that these writers draw no hard and fast distinction between exophthalmic goitre and toxic adenoma, regarding them as merely clinical variations of a single morbid state.

The thymus has in this edition been included among the ductless glands and the pages devoted to thymic enlargement and *status lymphaticus* are specially noteworthy. We were surprised, however, to find no reference to cerebral hæmorrhage in the section dealing with the mystery surrounding thymic death. This accident, resulting from the hypoplastic state of the vascular system so often associated with the thymic state, has now been recorded quite often in these cases of sudden death. Indeed it would be interesting to know in what proportion of such cases a full examination of the brain has been made.

Among other valuable contributions should be mentioned those dealing with Raynaud's disease and scleroderma, though both serve to bring home to us our lamentable lack of knowledge of the ætiology and in consequence of any rational treatment of these distressing maladies.

PSYCHOLOGY.

IN "Studies in Psychology," by Dr. William Elder, we see a return to a common sense explanation of the problems of psychology which for the last decade seemed to have fallen into the hands of the psycho-analysts with their unlimited theories and Greek conglomerates in lieu of plain English words.¹

The author is against the materialistic explanation of life and mental phenomena and regards them both as being riddles unsolved. In spite of this, however, he discusses and explains in clear language and reasonable argument the mechanism of the nervous system and the various mental processes of will, emotion, consciousness, dreams, somnambulism and hypnotic states. The synapses and the influence of the *thalamus* are discussed in regard to their importance in the functioning of the brain as the seat of the mind. Apparently Dr. Elder can appreciate how impulses along motor nerves can make muscles move and impulses along sensory nerves and tracts can produce sensations, but he is against the idea that consciousness can arise from physico-chemical forces. His criticism of the method of dream interpretation by the psycho-analysts would convince anybody but a fanatic that the claims of the followers of that school of thought are unwarranted. Dr. Elder points out that Rivers believed that the dream was a solution of a mental conflict, Freud that it was the fulfilment of a wish, Adler that it was a desire to dominate and so on and says that as Freud stated that dream interpretation is the *via regia* to the knowledge of the unconscious in the psychic life, we can judge as to whether this important method of the psycho-analyst can be relied on as of any scientific value. The book will be useful to those specializing in psychiatry and to the general practitioner. Were it not for the technical nature of parts of the subject the book would be welcomed as a pronouncement of facts by the laity who are confused by the mystic trend of some of the educated members of our race.

¹ "Studies in Psychology," by William Elder, M.D., F.R.C.P.E., F.R.S.E.; 1927. London: William Heinemann (Medical Books) Limited. Demy 8vo., pp. 226. Price: 8s. 6d. net.

The Medical Journal of Australia

SATURDAY, FEBRUARY 25, 1928.

The Branches and the Journal.

THERE appears to be a certain amount of confusion in the minds of many individual members of the several Branches of the British Medical Association in Australia in regard to the relationship between the Branches and THE MEDICAL JOURNAL OF AUSTRALIA. It is scarcely surprising that a clear conception of the state of affairs is lacking, since the constitution of the British Medical Association and that of the Australasian Medical Publishing Company, Limited, are understood by few outside the executive bodies. The matter concerns each member of the Branches in Australia and it may be advantageous if the facts are explained.

In 1847 an organization was formed within the medical profession in the Colony of New South Wales called the Port Phillip Medical Association. This association published its official organ, the *Australian Medical Journal*. The life of the journal was a short one; it lasted for twelve months. The second official organ of a medical association was also called the *Australian Medical Journal*. It was published in Victoria from the year 1854 and became the official organ and property of the Medical Society of Victoria. In the year 1880 the New South Wales Branch, the Victorian Branch and the South Australian Branch of the British Medical Association were formed and recognized by the parent association. At that time the only medical journal in Australia that had survived was the *Australian Medical Journal*. In 1881 Ludwig Bruck founded a journal called the *Australasian Medical Gazette* which was described as the official organ of the New South Wales, Victorian and South Australian Branches of the British Medical Association. The Victorian Branch was at that time not a strong body. The majority of the medical practitioners in the State of Victoria were members of the Medical Society of Victoria which owned the *Australian Medical Journal*. This journal absorbed the *Inter-*

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the Company are purely formal and the members at the annual meeting of the Company would always confirm the nomination by a Branch by electing the persons nominated. The Directors are chosen from among the eighteen members of the Company, one for each State and an additional Director in Sydney as a matter of expediency.

Whether the individual Branches of the British Medical Association in Australia call this journal their official organ or not is merely a question of terms. An official organ may be defined as a selected newspaper or magazine in which official notices and messages directed to members of an organization are published. When the official organ is not owned by the organization, those responsible for the publication of the newspaper or magazine necessarily have the right to refuse to insert any matter submitted, since the financial responsibility in the event of an action for libel would be borne by the newspaper or magazine and not by the organization. In the circumstances obtaining in connexion with *THE MEDICAL JOURNAL OF AUSTRALIA* it is obvious that the six Branches of the British Medical Association in Australia could not act as proprietors, even if a Federal *Companies Act* were in existence. The six Branches at times hold views and adopt policies that are difficult to reconcile one with another. It would be quite impossible for a responsible editor to be under the direction of six Branches that enjoy almost complete autonomy and freedom of action. The utility of the journal to the Branches is not restricted or diminished by the fact that the latter have no responsibility for the opinions expressed in the journal. In each capital city the journal has a representative whose appointment has received the approval of the Council of the Branch. It is the duty of the representative to act as liaison officer between the Branch and the journal and instructions are given that he shall further the interests of the Branch in the journal and of the journal in the Branch. The representatives are at all times prepared to forward to the journal matter that the Councils of the Branches desire to have published. Those responsible for the publication of the journal endeavour to meet the wishes of the six Branches and to render the journal a useful channel of communication and a powerful instrument for

propaganda. Dr. Kenny wrote in his letter referred to above the following words:

We in Victoria are confident that you will use wisely and well a power that has never hitherto in Australia been placed in the hands of one medical man to use for the presentation and advocacy of the requirements and ambitions of our profession and we assure you of our continued cooperation and support in your onerous task.

The growth of the British Medical Association within the Commonwealth and the arising of numerous determined minorities with heterodox views have not lightened this task. The journal must remain primarily the medium for the dissemination of scientific information. In addition to its didactic function, it has the duty of stimulating action for the improvement of the public health and for the prevention of disease. In order that the medical profession may achieve its objective, it is essential that its relations with official and non-official bodies outside the profession are amicable and that the terms and conditions under which medical practitioners conduct their work, are acceptable. The journal therefore is anxious to lend its assistance to the Branches of the British Medical Association to further medical knowledge and to improve the status and to maintain the dignity of the medical profession.

Current Comment.

THE SPHINCTER OF ODDI.

THE relationship between structure and function, always important, is nowhere found to be more worthy of consideration than in connexion with the entrance of bile into the duodenum. The first important study of this region in man and animals was made by Oddi in 1887. He studied man, the dog, sheep, ox, pig, cat, horse, pigeon and the common fowl. He found that the course of the common bile duct was different in the different species and that the arrangement of involuntary muscle fibres around the duct was different, but in each species he found a definite sphincter at the orifice of the duct. Many other workers have described a sphincter-like arrangement of muscle fibres around the end of the duct, but there has not been complete agreement in regard to the part played by these muscle fibres in the regulation of biliary secretion.

A. S. Giordano and F. C. Mann have studied this question and have discussed their findings.¹ They have investigated the intramural portion of the common bile duct "in more than twenty species of

¹ *Archives of Pathology and Laboratory Medicine*, December, 1927.

animal." They do not specify the animals, nor do they state how many of each species were examined. They find that it is usually possible to discover a definite bundle of smooth muscle fibres surrounding the common bile duct, contraction of which would tend to close the lumen. The amount of muscle tissue and its arrangement were found to differ considerably in the several species and in individuals of the same species; in many instances it was very meagre. In man it was found in some instances that the distal portion of the duct as it approached the duodenum was covered anteriorly by a thin fold of pancreatic tissue and that this persisted until the duct entered the wall of the duodenum. In other instances it lay in a sulcus on the surface of the pancreas. The authors go on to state that as the duct approaches the duodenum it runs parallel with it for a short and variable distance and then pierces the wall of the intestine to open into its lumen on the postero-lateral surface. This opening is usually represented by a longitudinal thickened fold pointing in a distal direction. Occasionally this fold is absent, only a small oval elongation being present. If the common bile duct is incised and its whole course through the duodenum is laid open, it is found that the so-called ampulla of Vater is a variable structure depending on the site of entrance of the duct of Wirsung into the duodenal end of the common bile duct. As the duct enters the duodenum, it is surrounded by muscle fibres from the duodenum which are reflected over the duct and intermingle with those of the common bile duct. In this way the wall of the intramural portion of the duct is thickened for a variable distance. This thickening does not extend around the orifice of the ampulla, but usually includes the pancreatic duct.

So much for the structure of the lower end of the bile duct. It remains to be determined what is the function of the muscular tissue just described and how this function is initiated. It is inconceivable that this intermingling of muscle fibres and its resultant thickening are without definite place and purpose. Nature is not so careless of her works. The muscle fibres from the duodenum surround the lower part of the bile duct and mingle with the fibres of the duct wall. There are two possibilities. Either the peristaltic movements of the duodenal wall and the resulting variations of tonicity are communicated to the fibres surrounding the outlet of the duct or else these fibres are endowed with a special sphincteric action. At the same time the latter possibility does not altogether exclude the former. The problem of the "sphincter of the choledochus" is inseparable from the problem of the mechanism of the filling of the gall bladder and that of the discharge of bile into the duodenum. There is no unassailable explanation of these. The liver secretes bile continuously, but at a varying rate and this depends on dietetic and other factors, but the discharge into the duodenum is intermittent. It is also definitely established that in the fasting state, when the discharge into the duodenum is least, the gall bladder is filled, but after the ingestion of certain foods it empties. Doyon reported a simul-

taneous relaxation of the sphincter and contraction of the gall bladder and Meltzer who was interested mainly in his conception of contrary innervation, postulated a reciprocal action between the gall bladder and the sphincter. Giordano and Mann hold that a failure to understand Meltzer's point of view and the too liberal interpretation of his assertions have undoubtedly retarded the accumulation of accurate data concerning the mechanism of the biliary tract. They make the definite statement with which most people will agree, that whatever may be the final explanation with regard to the filling of the gall bladder and the discharge of the bile into the intestine, the view that there is a sphincter around the common bile duct which acts like a faucet in draining the gall bladder is certainly not correct.

Giordano and Mann also refer to experiments which have been carried out by others with the object of proving that a sphincter does not exist, by transplanting the common bile duct partially or completely; dilatation of the biliary tract and stenosis of the duct at the site of implantation occurred. Even in animals treated in this way, which lived for several years, the biliary tract was not normal. The dilated biliary tract functioned as a whole and there was general stasis throughout the extrahepatic system. They also point out that it has never been questioned that peristalsis, variation in tone and spasm of the duodenal wall would influence the discharge of bile.

The final conclusion reached by Giordano and Mann is that there is definite evidence of the presence of a sphincteric mechanism at the duodenal end of the common bile duct. Although it has not been definitely proved, it would appear to be true that this mechanism represents a true sphincter and is not simply due to variations of tone in the duodenal wall. At the same time they qualify this assertion by the statement that the discharge of bile into the intestine is modified and in some respects depends on peristalsis of the duodenum, but that the exact relationship of the two processes is not clear. This appears to be a complicated and unsatisfactory conclusion. They leave untouched the other aspect of the question, namely, how the function is initiated. If the hormonal theory of control of digestive secretions be accepted, a working hypothesis of an acceptable nature can be formed. Peristalsis and tonicity of the duodenum and tonicity of the biliary tract are under the control of the sympathetic nervous system. If Nature has provided more muscle at one place than at another, it is probably because there is something definite for the muscle to do. Thus it will not be a question of what the duodenum or the gall bladder or the sphincteric muscle does, but of how the "chemical messengers" summon each part into action. It is doubtful whether the truth will ever be learned by observation on animals which have been subjected to mutilating operative procedures. The sympathetic nervous system has in these circumstances been exposed to serious injury and subsequent observations must to a large extent be discounted.

Abstracts from Current Medical Literature.

SURGERY.

Hydrocele of the Tunica Vaginalis.

MEREDITH CAMPBELL (*Surgery, Gynecology and Obstetrics*, August, 1927) analyses an investigation of five hundred cases of hydrocele of the *tunica vaginalis*. Infection and trauma are the usual causes. It is a relatively common condition. In two-thirds of the cases no cause can be assigned, probably painless subacute epididymitis, non-venereal, is the underlying factor in a great number of instances. The condition is most commonly found in young adults. In infancy it is as a rule congenital and associated with hernia. Acute hydrocele usually produces symptoms and pain is the usual symptom. In the chronic type a sense of mass and of weight is noted. Transillumination of a scrotal mass is pathognomonic of hydrocele. While simple tapping, with or without injection of irritants, relieves many, open operation, preferably excision and eversion of the sac, is the most notable method. Local anaesthesia is most suitable for these cases. Complications are not uncommon after operation, loss of the testicle by infection being the most usual. The average stay in hospital of all patients was 0.4 days. The chance of recurrence is about three times greater following tapping and injection than after open operation.

Peritonitis.

VERNON C. DAVID (*Surgery, Gynecology and Obstetrics*, September, 1927) explains his deductions from a critical study of work done in investigating the problem of peritonitis. Experiments have been carried out on the absorption of the peritoneum bearing on the subject of the passage of colon bacilli from the peritoneum into the blood and lymphatic channels. The author found that the absorption of fluid from the pleura and peritoneum increases in amount by absorption of fluid from the blood until the intraperitoneal solution becomes isotonic with the blood, when slow absorption takes place. Hypotonic solutions on the other hand are rapidly absorbed into the blood. In a fully developed peritonitis the rate of absorption is decidedly slowed. Increased peristalsis increases the rate of absorption. Opening the abdomen decreases the absorption and drying the intestines by evisceration also has this effect. There is no direct relation between diuresis and the absorption from the peritoneum. It was thought that when solid particles pass into the lymphatics of the peritoneum they do so by way of the stomata, but Muscatello has proved that the stomata are artefacts. Particles are taken through by phagocytes. Thiele and Embleton injected micro-organisms into the peritoneal cavity

and found that they appeared in the thoracic duct chyle in two to twenty minutes. If the thoracic duct had been previously tied, no organisms appeared in the blood stream. Colon bacilli injected into the peritoneal cavity containing a transudate pass rapidly and in great numbers into the blood stream. It is assumed that in a well developed peritonitis bacteria do not pass directly into the blood or lymphatic stream and that the major problem in peritonitis does not concern itself with the development of a septicæmia.

Tumours of the Carotid Body.

R. P. SULLIVAN AND A. FRASER (*Surgery, Gynecology and Obstetrics*, August, 1927) report two cases and discuss the tumours of the carotid body. The two cases reported represent two different types of growth. It has been shown that one of these is a neuroblastoma and it is suggested that at least some of those classified in the group of carotid tumours and vaguely described as sarcoma-like, endotheliomata *et cetera* are of the same nature. Both types of carotid body neoplasm, paraganglioma and neuroblastoma, especially the latter, may become malignant and as the early stages of growth constitute the only favourable time for operation, early extirpation is strongly recommended. The control of hemorrhage, operative and postoperative as well, constitutes the most difficult problem connected with the treatment. The postoperative disabilities of the condition are pneumonia, hemorrhage, cerebral anæmia and infection. This is the order in which they cause death. Aphonia without vocal cord paralysis may occur. Recurrences have been reported.

Gastro-Jejuno-Colic Fistulæ.

IAN MACDONALD (*The Lancet*, October 15, 1927) writes on the subject of gastro-jejuno-colic fistulæ and comments on six cases. The gastro-jejunal or anastomotic ulcer in approximately every fifth male patient slowly perforates into the colon. The onset of this dire sequel of gastro-enterostomy is announced by four cardinal symptoms—diarrhœa, fecal vomiting, foul eructations and variable pain. Pain may be absent; diarrhœa is often the initial and continuous symptom. The clinical diagnosis is seldom doubtful; confirmation may be obtained by X ray examination, when the most important sign is rapid emptying of the stomach and the immediate filling of the transverse colon. The profound weakness of the patient may simulate that seen in malignant disease, but the horrible odour of the vomitus leaves no doubt. Operation in view of the fatal prognosis is imperative. If after the first operation the pylorus is patent, the minimum operation may be performed—separation and closure of the three openings. If the pyloric outlet is still obstructed, a new gastric outlet must be provided. Theoretically a further

gastro-entero-enterostomy should be banned, but practically it may be necessary. Pauchet recommended in difficult cases the removal *en masse* of the right half of the colon and the fistulæ, the right half of the stomach and the jejunal loop without an opening being made into any of their cavities. He advocates this method as easier for the surgeon and safer for the patient when the inflammatory mass is large and the colon affected by stricture, when the ascending colon is dilated and if the middle colic artery is accidentally injured. The author has had no experience of this radical operation, but on one occasion a wound of the middle colic artery forced him to undertake a segmental resection of the transverse colon. In the preoperative treatment lavage of the stomach with weak iodine solution has given the best results. For some days previously opium is given and the patient is allowed full diet up to the day before operation. At operation all adhesions are carefully ligated and the dissection made carefully and systematically from the periphery to the centre of the fistula. The openings in the colon and jejunum are closed in a transverse direction. The opening in the stomach is closed in its long axis unless it is wanted for a further gastro-enterostomy. The important point as to the need of a temporary caecostomy arises. Some surgeons consider it necessary even with simple suture of the colon to avoid tension on the suture line, when the suture of the colon has been difficult or imperfect (Balfour). After segmental resection of the colon a caecostomy is essential. The mortality associated with the operation is not unduly high.

Abdominal Symptoms of Heart Disease.

ALFRED M. WEDD (*Surgery, Gynecology and Obstetrics*, December, 1927) discusses the abdominal symptoms of heart disease in special reference to the rôle of auricular fibrillation. There is a certain group of patients suffering from cardio-vascular disease who present symptoms which bring them to a surgeon. Coronary obstruction may bring about symptoms of abdominal angina. It should be borne in mind that in children nausea, vomiting and abdominal pain may announce acute pericarditis. Attacks of acute paroxysmal tachycardia are occasionally attended by epigastric pain. The most common sign of a failing heart is enlargement of the liver due to venous engorgement and as a corollary, the most common cause of enlargement of the liver is passive engorgement. Failure to remember this has led to more than one harmful laparotomy. The liver symptoms are most often associated with auricular fibrillation. Distension of the liver capsule, due to rapid engorgement, causes acute pain in the upper part of the abdomen. Other abdominal symptoms are nausea and vomiting or vague indigestion and flatulence. Abdominal symptoms

resulting from infarction of the spleen and perisplenitis occurring in subacute bacterial endocarditis have been observed. However, even if an unnecessary laparotomy has been performed, patients with heart conditions usually stand operation well.

The Toxæmia of Duodenal Fistula.

W. WALTERS AND J. L. BOLLMAN (*Journal of the American Medical Association*, November 26, 1927) state that the toxæmia of acute duodenal fistula is due for the most part to a loss of the acid and chloride of the gastric and the pancreatic juice discharged through the fistula. The discharge of acid turns the tide of the neutrality of the blood strongly towards alkalinity and the loss to the body of chloride reduces the chloride of the blood from a minimal normal of 560 milligrammes to as low as 320 milligrammes. In duodenal fistula there is loss to the body of large quantities of fluid. Even if loss of the acids and chlorides in the gastric secretion from a duodenal fistula is prevented by gastro-enterostomy, disturbance in motility in the upper intestinal tract causes an increase in the excretion of chlorides from the body through the intestinal and urinary tracts. Continuous loss of pancreatic secretion is fatal, whereas loss of bile and duodenal secretion is not lethal.

Acute Surgical Diseases of the Abdomen in Children.

MORRIS COHEN (*Surgery, Gynecology and Obstetrics*, November, 1927) writes on the acute surgical diseases of the abdomen in children and bases his statements on the records of four hundred patients treated at the Lebanon Hospital, New York. All the children were under thirteen years of age. He finds that the pathological conditions can be classified into two groups. The first and by far the larger includes all those that are primarily inflammatory in character. The second group consists of those conditions due to some mechanical derangement of normal relations. Of the inflammatory group the commonest disease was acute appendicitis and it is necessary to emphasize the importance of adhering closely to the classical set of symptoms, abdominal pain and vomiting, in making the diagnosis. When there is any deviation from the usual sequence of these symptoms unquestionable physical signs should be sought. Tenderness and rigidity in the right lower quadrant were the prominent signs in the author's series. Other important acute abdominal conditions found commonly were pyelitis and mesenteric lymphadenitis. Primary peritonitis offered great perplexity in diagnosis and treatment. In spite of all treatment it is usually fatal. Acute intestinal obstruction is the most frequent mechanical disease. Acute intussusception is the most frequent form of obstruction found and next in order is that due to incarcerated inguinal hernia. Intestinal

obstruction in the new born is always due to a congenital anomaly of the gastro-intestinal tract.

Carcinoma of the Rectum.

F. W. RANKIN (*Journal of the American Medical Association*, December 3, 1927) states that certain principles have been laid down in the operative treatment of carcinoma of the rectum. The two cardinal principles are the establishment of a colostomy and a wide dissection of the area affected. Of 602 patients considered over a ten year period, not including those suffering from tumours of the recto-sigmoidal junction, 60% had died, the hospital mortality being 8.9%. In 89.5% bleeding was the most prominent symptom, in 20% diarrhoea, in 55% constipation and whilst in 7% the obstruction was subacute, in no instance did it require an emergency operation. All growths of the rectum are adenocarcinomata derived from the cells of the crypts of Lieberkühn; epithelioma is frequently found in the anal canal. The three commonest sites are the recto-sigmoidal junction, the ampulla of the rectum and the anal canal. Ampullary growths usually involve only portion of the bowel wall, although complete circumferential obstruction or filling of the lumen is common if the tumour is of the papillomatous type. Frequently, starting near the mesenteric border, it produces immobility of the bowel by extension. Growths of the anal canal are usually found opposite the mesenteric border and rarely cause complete obstruction, except in advanced cases. Lymphatic glands were involved in 39% of cases. Whilst the presence of enlarged glands affects the prognosis, their proximity to the bowel should not contraindicate operation. Hard palpable glands are not necessarily malignant. In rectal malignant disease lymphatic involvement is slow. Operability depends on the presence of distant metastases to peritoneum and liver, diffuse lymphatic involvement, fixation of the growth of vital adjacent structures and the pathological type of the growth. Fixation to the prostatic capsule does not contraindicate operation, unless the growth is densely firm; fixation of the growth in the hollow of the sacrum renders it more accessible to operation than elsewhere and it is usually possible to find a line of cleavage which permits the satisfactory clearing out of the entire sacral cavity. Involvement of the lymphatics adjacent to the bowel or even of the group above them should not unfailingly contraindicate operation. The author believes that a greater number of patients with advanced tumours and of those whose tumour is fixed, should be operated upon. Pathological classification has a more important bearing on end results than anything else; Broder's classification is the best index of prognosis. Several factors influence the selection of the type of operation: the site and size of the growth, freedom from metastases, the

patient's age and the anatomical type of the growth. In 382 cases the two-stage procedure of colostomy and resection was followed. The inguinal type of colostomy is preferred to that through the rectus; the opening in the sigmoid is made at the highest point in the sigmoid, care being taken to shut off the space between the sigmoid and lateral parietal peritoneum by a purse string suture. No sutures are placed in the wall of the bowel; the bowel is retained in position by suturing peritoneum and skin together through a small hole made in the mesentery. The colon should not be opened for twenty-four hours or preferably longer. The second stage consists in the radical removal of the rectum and adjacent parts *et cetera*. It is performed under transsacral anaesthesia and is described in detail.

Carcinoma Following Gastric Ulcer.

H. FINSTERER (*Wiener Medizinische Wochenschrift*, October 1, 1927) reviews his results following operation for gastric carcinoma. Malignant changes were noted in 21% of the ulcers resected. He has never seen carcinoma following duodenal ulcer. The early clinical diagnosis is often very difficult. He divides his cases into two groups: (i) those in which the clinical findings resembled gastric ulcer and in which the tissues were found to be malignant on histological examination, (ii) cases diagnosed as carcinoma and confirmed by microscopical examination. There were twenty-four patients in the first group and two died immediately after operation. Seven (31%) were free from recurrence for more than three years and the remainder died from metastases or intercurrent disease within that period. Out of fourteen patients in the second group two died following operation and only two were alive after three years. In a series observed for five years 26% of the first group were still alive, but none of the second. The prognosis in cases diagnosed only after microscopical examination was much worse than in undoubted cases of carcinoma. Resection of the stomach and pancreas has given better results than mere resection of the ulcer. Of seventy-four of these patients 35% lived three years and 33% more than five. Patients whose condition was diagnosed only by histological means, were all dead from secondary growths within that period. This was to be expected, for in all the suspicious cases two-thirds of the stomach as well as the whole lesser curvature and the lymphatic glands were removed, whereas in apparently simple cases the ulcer alone was resected and the glands left intact. He advises that every patient with symptoms of less than one year whose radiological picture is normal, should first have medical treatment. If this be unsuccessful after several months, operation should follow. In his hands the operative mortality of gastric resection, mainly under local anaesthesia, is only 3.8%.

Special Abstract.

THE RETICULO-ENDOTHELIAL SYSTEM.

In his original description of the reticulo-endothelial system, Aschoff grouped together certain cells of the body because of their function of producing reticulum and of lining sinusoid blood and lymph spaces. Since Aschoff's original work was done, pathologists generally have accepted his views. Not only has this conception proved useful from the point of view of classification, but it has led to a better understanding of certain obscure pathological processes. Reference has been made to the reticulo-endothelial system on several occasions in this journal, but no connected account has been given for the benefit of Australian practitioners. In these circumstances it will be useful to set out the salient features of a "general review" which has recently been made by R. H. Jaffé.¹

In the introduction to his review Jaffé states that while some authors feel that the inclusion into one group of all the various cells of which the reticulo-endothelial system is composed, lack a sufficient background, the majority of investigators have found the system a useful starting point for a great variety of observations. His review has been written from the standpoint of pathological conditions in man.

The most reliable method of demonstrating the distribution of the reticulo-endothelium is by the use of vital stains. Experiments on vital staining in man were carried out by Eppinger and Stöhr and by Ledofsky. They injected saccharated iron intravenously into moribund patients and found deposits of iron in the Kupfer cells of liver and in the reticulo-endothelium of the spleen, bone marrow and lymphatic glands. Ledofsky also found iron granules in the alveolar epithelium of the lung. The intensity of the iron storage seemed to be influenced by the underlying pathological condition. Whether the capillary endothelium in general should be included in the reticulo-endothelium is still a matter of discussion. Not only are there differences between the higher and lower animals, but there exist also pathological conditions in which the common capillary endothelium seems to assume qualities otherwise found only in the reticulo-endothelium cells. Another point for discussion is whether the reticulum cells of the thymus and the glia cells of the central nerve tissue should be classed with the reticulo-endothelium. They store iron, fat and cellular *débris*, but are of ectodermal origin. It should be pointed out that the reticulo-endothelial system consists essentially of mesenchymatous cells. Ssyssojew found that in the thymus undergoing rapid involution the cellular *débris* is engulfed by phagocytic cells, apparently derived from ectodermal reticulum. Recent studies by Popoff, from Maximow's laboratory, suggest, however, a definite mode or origin of at least some of the phagocytic thymus cells. They are said to develop from the mesenchymatous adventitial cells of the smaller blood vessels. All investigators agree that the Marchand's adventitial cells belong to the reticulo-endothelial system. Williamson and Pearce described an endothelial reticulum lining the lymph spaces in the human thyroid and parathyroid and they compare this reticulum with the Kupfer cells of the liver. The accumulations of round cells, commonly found in the suprarenal body, are according to Paunz derived from reticulo-endothelial cells. There is some difference of opinion in regard to reticulo-endothelial cells of the female sex organ; Richter states that they are scanty in this situation and Hofbauer holds the opposite opinion. Removal of the spleen in some animals has been found to cause a proliferation of the stellated cells of the liver, but Schmidt found only an enlargement but no proliferation of these cells following splenectomy in human beings.

Reticulo-Endothelium and Blood Formation.

Jaffé first of all refers to granulopoiesis and discusses the question as to whether the reticulo-endothelial cells in human beings give rise to the local formation of

granulated blood cells, as has so often been described in animal experiments. No exact determination has so far been reached in this matter. Aschoff states that he has not yet been able to come to a definite conclusion. In animals there has been described a transformation of adventitial and endothelial cells to granulocytes; the change was a rapid one. In human beings no such rapid change has been described. These statements about granulopoiesis hold true also in regard to the supposed development of lymphocytes from reticulo-endothelial cells. In spite of many studies by such observers as Heueck and Maximow the differentiation of adventitial, reticular or endothelial cells to lymphocytes has not yet been definitely proved. Petri described the development of red and white lymphatic glands on the retroperitoneal tissue in acute infectious disease. These glands originated from proliferating reticular and endothelial cells.

The views of many authors on the origin of the large mononuclear cells of the blood are given. Mononuclear cells containings granules of dye have been described as occurring in the blood of animals that have been treated with vital stain. This observation indicates that at least some of the mononuclear cells of the blood are derived from the reticulo-endothelial system. The dye-carrying cells are much more numerous in the right ventricle of the heart than they are in the left or in the peripheral circulation. It is supposed therefore by Aschoff, Kiyono and others that most of the vitally stained mononuclear cells given off by the reticulo-endothelial of the spleen, liver and other organs are too large to pass the capillaries of the lungs. They are either held back in the lung and migrate from the vessels or break down. Kiyono distinguishes three types of mononuclear cells in the blood of the rabbit: histogenic, myeloid and lymphogenic monocytes and only the first takes the vital stain. Mononuclear cells which on account of their content of phagocytosed material can be traced to the reticulo-endothelial system, have been observed in human blood in various pathological conditions such as malaria, lipæmic conditions, severe anæmia, pernicious anæmia after blood transfusion, sickle cell anæmia and after splenectomy. Large phagocytic endothelioid blood cells have also been described in sub-acute bacterial endocarditis. In these diseases an intense phagocytic activity of the reticulo-endothelium is found. It will also be remembered that the relation of the monocytes to tuberculosis has been emphasized. Reference was made to this subject and to the reticulo-endothelial system in our issue of December 10, 1927. Jaffé asks whether the macrophages just referred to are identical with or related to the monocytes of the normal blood. He then refers to the conclusions of numerous authors on this question and points out how widely divergent they are. He concludes that the monocyte problem is still far from settled and states his opinion that the normal monocyte is derived from the reticulo-endothelium of the spleen, liver, bone marrow and lymphatic glands. He doubts whether much is gained by subdividing the large mononuclear cells of the blood. Differences between single cells may be due to their different ages and states of functional activity. Many of the monocytes contain a fine oxydase granulation which is different from that of the granulocytes. In severe infectious diseases, especially those in which the skin is involved, capillary endothelial cells may also be present in the circulating blood. Their transformation to monocytes remains to be proved.

Abnormal mononuclear cells in large numbers are also observed in a mild infectious disease, known as infectious mononucleosis, the aetiology of which is unknown. Cases of this disease have been reported in THE MEDICAL JOURNAL OF AUSTRALIA of November 7, 1925, and April 10, 1926. The nature of the abnormal mononuclear cells is still undecided. Some investigators believe that they are of lymphocytic origin, but according to Halziefanu and Goia they react to epinephrine differently from lymphocytes. Hopman speaks of stem cells and Krawiewski and Henning suggest that both lymphocytes and monocytes may give rise to these cells. Histological examination of the enlarged lymphatic gland reveals proliferation of the lymphoid cell as well as of the reticulum cells. It is therefore possible that both types of cell may enter the blood stream in abnormal numbers.

¹ Archives of Pathology and Laboratory Medicine, July, 1927.

The existence of a third type of leucæmia has been suggested by Reschad and Schilling. This is characterized by the appearance in the blood of immature monocytoid cells and by an excessive proliferation of the reticulo-endothelial cells. Other observers have supported the findings of Reschad and Schilling. While Ferrata and those of his school accept the monocytic leucæmia as a hæmatogenous entity, Naegeli believes that the monocytic type is nothing but a temporary initial variation of the myeloblastic leucæmia. Judging from the clinical and hæmatological material at hand, there is no doubt much similarity between monocytic and acute myeloblastic leucæmia. Hoff explains the transformation of the former into the latter in the following way. In the former an indifferent mesenchymatous tissue proliferates. If it remains in this indifferent stage, the leucæmia does not change its character. If the immature mesenchyme develops, it produces myeloblasts and the monocytic leucæmia passes into a myeloblastic leucæmia. At the same time Sternberg believes that the whole group of monocytic leucæmia still lacks a sufficient background and Krahm also doubts whether it is justifiable to speak of a new type of leucæmia.

Reticulo-Endothelium and Blood Destruction.

Under normal conditions the worn out erythrocytes break down in the circulating blood by fragmentation. In health phagocytosis of red cells is insignificant. Under various pathological conditions, however, reticulo-endothelial cells may display an intense phagocytic activity. They often engulf enormous numbers of erythrocytes and their debris. There are two possible ways of explaining this excessive phagocytosis. Either there is an abnormal increase in the functional activity of the reticulo-endothelial cells or else changes in the erythrocytes themselves render them more liable to phagocytosis. The first possibility has been considered in connexion with certain forms of anæmia, such as pernicious anæmia, the anæmia associated with carcinoma and hæmochromatosis. Phagocytosis of erythrocytes has often been described in acute infectious diseases. Mallory suggests that the phagocytosis of erythrocytes of enteric fever is due to a stimulation of the phagocytes by bacterial toxin. Jaffé holds that it is much more likely that in infectious diseases the red cells that are engulfed, are abnormal. The increased functional activity of the histiocytes is then not primary but secondary to an increased demand for removal of the injured blood cells. Jaffé also suggests as another explanation the adsorption of bacterial toxin through corpuscles of the blood. By destroying the erythrocytes laden with toxin the macrophages eliminate the latter substances from the blood stream. In infectious diseases the whole of the reticulo-endothelial system is involved in the process of destruction of erythrocytes. In the hæmolytic anæmias, on the other hand, phagocytosis shows a predilection for certain organs. In pernicious anæmia, for example, the phagocytosis of red cells in the spleen is much less pronounced than it is in other parts of the reticulo-endothelial system. The spleen is the organ which contains the largest amount of reticulo-endothelial cells. Their action on the erythrocytes must therefore be other than by phagocytosis. It is possible that the splenic histiocytes excrete substances that dissolve the red cells or make them more liable to be destroyed in the circulating blood or in other organs. Jaffé gives details of certain observations on sickle celled anæmia to support this possibility. He thinks it probable that the transformation of the disc shaped red cells to sickle cells takes place in the spleen under the influence of the reticulo-endothelium. The erythrocytes are no doubt of inferior quality from the very beginning. It is in the spleen that their weakness becomes manifest. The disfigured cells finally undergo phagocytosis by the reticulo-endothelial cells of the liver and of the abdominal lymphatic glands. Similar conditions may be present in other forms of hæmolytic anæmia, although the action of the splenic histiocytes on the red blood corpuscles cannot be demonstrated by morphological changes.

Phagocytosis of leucocytes and of blood platelets also occurs. In myeloid leucæmia an intense phagocytosis of

the immature leucocytes by the Kupffer cells of the liver has been found. In granulation tissue phagocytosis of leucocytes by macrophages is constantly present. In some forms of thrombocytopenic purpura the underlying pathological conditions seem to be an abnormal destruction of blood platelets in the spleen.

Reticulo-Endothelium and Iron Metabolism.

Jaffé also discusses reticulo-endothelium and iron metabolism. The reticulo-endothelial cells store the iron that is liberated from disintegrated red blood cells. There are three different ways by which the iron may get into these cells; it may result from the intracellular digestion of erythrocytes which have undergone phagocytosis; the reticulo-endothelial cells may take up the hæmoglobin of cells dissolved in the circulating blood and transform it into hæmatin and iron pigment or finally this transformation may take place in the plasma of the blood and the histiocytes may reabsorb the ready iron. The iron pigment which appears in the cell as dark brown granules is called hæmosiderin. Little is known of the final disposition of this pigment. The body apparently tries to retain it and several facts indicate that it is used over again for the formation of new hæmoglobin. In this internal iron metabolism the reticulo-endothelial cells play an active part. Apart from the deposits of iron derived from a breaking down of red cells in hæmorrhages and thrombi hæmosiderin is found in the presence of acute infectious diseases, severe nutritional disturbances, hæmolytic anæmia and hæmochromatosis.

Reticulo-Endothelium and Formation of Bile Pigment.

During recent years much information has accumulated suggesting a formation of bile pigment in places other than in the liver cells. The only function which the liver cells are said to have in connexion with bilirubin, is to excrete it, thus securing its constant level in the blood. Some investigators, however, still believe that it is only the liver cell that forms bilirubin. Bilirubin is derived from hæmoglobin. Since the reticulo-endothelial cells are so closely connected with the destruction of blood, it seems probable that these cells also produce the bile pigment. The transformation of the hæmoglobin into bilirubin may take place in the histiocytes or in the circulating blood. In the latter case it is likely that the ferments which split up the hæmoglobin molecule, are given off by the reticulo-endothelial cells.

Reticulo-Endothelium and Lipin Metabolism.

Fat Storage in Histiocytes Resulting from Local Destruction of Tissue and Resorption of Fat.

The reticulo-endothelial cells have a great affinity for lipoids, especially for collesteral esters. In destruction of tissue these cells often store the fat set free from the disintegrating cells and become thus transformed into large foamy mononucleated and multinucleated cells, the cytoplasm of which is filled with anisotropic lipid droplets. Other cells, too, such as capillary endothelial cells, fibroblasts and even epithelial cells, may undergo a similar transformation, but the majority of the pseudo-xanthomatous cells, as Aschoff calls them, are derived from the local histiocytes. This can be demonstrated by their vital staining.

Fat Storage in Histiocytes Resulting from Disturbances of the Lipin Metabolism.

The accumulation of lipoids in the histiocytes is not always due to the local resorption of fat. There are instances in which these changes are manifestations of a disturbed fat metabolism. One of these is xanthomatosis. Well known examples are the xanthomata of the skin, the xanthelasmata of Aschoff. There are often cases of idiopathic xanthomatosis in which the cause of the hypercholesterinæmia cannot be determined. In some instances the localization of the xanthomata plaques in the skin may be determined by mechanical irritation.

Another example exists in lipæmic diabetes. This condition may also cause the storage of lipoids in the histiocytes of the spleen. Extreme lipid infiltration of the

splenic reticulo-endothelial cells produces a characteristic macroscopical appearance of this organ. The spleen is distinctly enlarged, soft, without structure and bright brick red. The pulp consists almost entirely of large foam cells crowded with fat that stains black by the method of Lorrain Smith. Often granules and droplets of neutral fat or cholesterol esters are also present.

Another example is found in Niemann's disease. Peculiar severe disturbances of the lipin metabolism occur in infancy and in earliest childhood when the spleen manifests changes similar to those observed in lipæmic diabetes. The infiltration of the macrophages with lipoid material is, however, much more generalized than it is in diabetes. The reticulo-endothelial cells of the spleen, bone marrow and lymphatic glands, the adventitial cells of the loose connective tissue, the Kupffer cells of the liver and the reticulum cells of the thymus are all involved. The cells are also present in the mucosa of the small intestine and in the capillaries of lung, kidney and pancreas. They are not found in the peripheral blood, because they are apparently too large to get into the peripheral blood vessels.

In Gaucher's disease the occurrence of the Gaucher's cells is limited to the hæmopoietic organ. The cells develop from the reticulum cells and from the adventitial cells of the arterioles and capillaries. According to Pick the endothelial cells are not involved. The reticulum cells that have been transformed into Gaucher cells, are still able to engulf blood cells.

Reticulo-Endothelium, Protein Metabolism and Carbohydrate Metabolism.

The storage and intracellular transformation of proteins by the reticulo-endothelial cells have so far not been demonstrated. This is chiefly due to the fact that there are no methods at hand which allow a differentiation of stored proteins from the cell proteins proper.

Demant's experiments indicate that the reticulo-endothelial system takes part in the carbohydrate metabolism. He observed in fasting dogs a distinct increase of the blood sugar after intravenous injection of colloidal silver which is stored readily by the reticulo-endothelial cells.

Reticulo-Endothelium and Infection.

The intimate connexion of the reticulo-endothelial cell with the defence reaction of the body against infections is indicated by numerous observations. As more has become known about these cells, the origin of most of the immune bodies has been traced to them. Thus immunity which was not long ago a humoral question, once more becomes a cellular question as first advocated by Metschnikoff. Jaffé does not discuss the rôle of the histiocytes in inflammation, their relation to the other inflammatory cells nor the question of their mutual transformation. He does not do so on account of lack of space; he points out that the study of Metschnikoff, Marchand and Maximow in this field belong to the classics of medicine.

The following functions have been attributed to the reticulo-endothelial cells in connexion with infections: the phagocytosis and intracellular destruction of microorganisms; the reception, detoxication and digestion of the waste products that are formed during the process of inflammation, including the toxic substances liberated from the bacteria; the absorption of soluble toxins; the secretion of antibodies.

Phagocytosis and Host Cells.

Among the free cells of an exudate the polymorphonuclear leucocytes or macrophages are much more active than the macrophages. If, however, the bacteria enter the blood stream and come into contact with the fixed histiocytes, the latter become the worst enemies of the bacteria. Macrophagocytosis is therefore of greater biological value than microphagocytosis. In immunized animals the phagocytosis of bacteria by the reticulo-endothelial cells is greatly hastened and intensified. In infectious diseases in man the phagocytosis of pathogenic microorganisms by the reticulo-endothelium of the internal organs is much less

distinct than it is in the artificial infections of animals. In natural infections the bacteria usually enter the blood stream gradually and the activity of the histiocytes, therefore, extends over a much longer period of time than in animals injected with bacteria. When in certain diseases the macrophages contain large numbers of bacteria or of protozoa, it is often difficult to decide whether the phagocytosis means the destruction of the microorganisms or whether the macrophages act as hosts. Jaffé here refers to the work of Cunningham, Sabin, Sugiyama and Kindall (see THE MEDICAL JOURNAL OF AUSTRALIA, February 20, 1926) on the phagocytosis of tubercle bacilli by monocytes. These observers hold that the cells usually fail to destroy the bacilli and that the number of bacilli which can be seen within an individual cell, points to the idea that the bacilli multiply within the cell. They suggest in fact that the tubercle bacilli live as parasites within the monocytes. Jaffé points out that there are many forms of tuberculosis in man, however, in which tubercle bacilli are scanty. Moreover, the morphological changes of the bacilli in the epithelioid cells of tubercles in man are in his opinion difficult to explain other than by their gradual disintegration.

Leishmaniosis is a specific disease of the reticulo-endothelial cells. Large numbers of parasites fill the swollen histiocytes. They manifest no signs of disintegration and the histiocytes seem to be entirely passive.

Resorption of Waste Products, Antibody Formation and Absorption of Toxins.

The resorptive functions of the reticulo-endothelial cells in infections are suggested by their swelling and by their increased affinity for basic stains resulting from an increased acidity of the cytoplasm. The formation of vacuoles in the cytoplasm can be explained on the same basis. Pathological conditions in man offer no direct information, but the absorption of toxins and the production of antibodies are indicated by the results of experimental study. The most important of these experiments are those concerned with the depression or stimulating action of the so-called blockade of the reticulo-endothelial cells with vital stains or colloidal metals. Jaffé points out that it is impossible to speak of a complete elimination of the entire reticulo-endothelial system by these crude methods. This has been proved by their failure at the hands of certain observers. He believes, however, that if the injections are given over a sufficient length of time and are combined with a removal of the spleen, there can be no doubt that the storing of the dye or metal interferes with the formation of antibodies.

Reticulo-Endothelium and Malignant Tumours.

Relations Between Reticulo-Endothelium and Tumours in General.

Neudorfer suggested that the reticulo-endothelial cells are important in preventing metastases of malignant tumours. Similar conclusions can be drawn from the investigations of Lazarus, Barlow and Parry on the resistance of the spleen against grafts of Jenner's sarcoma. Erdmann, on the other hand, showed that an irritation of the reticulo-endothelial cells with Indian ink makes possible a transplantation of tumours by killed tumour cells or tumour filtrates. The experience with tumours in man at the first glance lends no support to the view that resistance against tumours depends on the histiocytes. It is true that metastases to the spleen are rare. They are common, however, in the other organs of the reticulo-endothelial system, especially in the liver and lymphatic glands. Jaffé has found that in the glands with an intensive new formation and desquamation of the endothelial cells metastases are usually absent, but that they are found when there is no evidence of reaction in the endothelium. He puts forward the suggestion that the proliferation of the endothelium is a defence reaction against tumour cells carried to the glands with the lymph stream.

Tumours of Reticulo-Endothelial Cells.

Tumours consisting of monocytes have so far not been reported in man. There are, however, tumours that

originate from the fixed reticulo-endothelial cells. Amongst such tumours which have been described are hamangio-endotheliomata of the liver, malignant tumours of the spleen derived from the reticulum and endothelial cells and certain multiple or systemic tumours of the lymphatic glands. Piney has described a reticulo-endothelioma. Connor regards the endothelial myeloma of the long bones as a reticulum cell tumour of the bone marrow. Frazer describes *mycosis fungoides* as a reticulum cell sarcoma of the skin.

Australasian Association for the Advancement of Science.

THE NINETEENTH MEETING OF THE AUSTRALASIAN ASSOCIATION FOR THE ADVANCEMENT OF SCIENCE was held in Hobart from January 16 to 20, 1928.

SECTION OF MEDICAL SCIENCE AND NATIONAL HEALTH.

In the Section of Medical Science and National Health Dr. J. H. L. CUMPTON, the President, delivered a highly interesting address on the history of the development of public health administration in Australia. It is proposed to publish the address in a subsequent issue.

The Treatment of Goitre.

In a paper on the medical treatment of goitre Dr. TERENCE BUTLER stated that in spite of the success obtained by surgeons in toxic varieties of goitre, other avenues awaited fuller investigation. He criticized the casual doses often given of iodine and expressed the opinion that forty milligrammes a day was sufficient. In McCarrison's standards of neck measurement, the minimum circumference being taken over the most prominent part of the goitre, a 2.0 to 2.5 centimetre increase in the circumference of a thirty-three to forty centimetre neck was regarded as equivalent to a double volume of the thyroid; a further 2.0 to 2.5 centimetre increase as a treble volume and a further 1.25 to 2.0 centimetre increase as representing a quadruple volume. The reduction produced by treatment given could thus be followed. Iodine caused rapid reduction at first, slowing after three or four weeks, when the colloid had decreased, the usual time for cure being three to six months, though in large goitres of long duration a year might be needed. If symptoms of hyperthyroidism occurred, the dose was lessened or the iodine stopped altogether. Occasionally no reduction was obtained, especially in adeno-parenchymatous goitre. No clinical distinction could be drawn between those which could be reduced and those which could not be reduced with iodine. Those that resisted treatment with iodine might be arrested by thyroid gland on the analogy of "Insulin" in pancreatic diabetes. The majority of such goitres could be controlled by this treatment. One of two patients who did not improve, recovered on going to a non-goitrous area. If the patient returned to a goitrous district iodized salt was recommended. In simple goitre with symptoms such as rapid heart and slight influenza, the same plan was carefully used. If the symptoms increased the iodine was withheld and septic foci were looked for. In the records of 53 patients, 35 were cured (six months' observation at least), two were improved, two were not improved, twelve were still under treatment; two deaths, one from pneumonia and one after operation, had occurred. These goitres often decreased very rapidly and hyperthyroid symptoms occurred. The iodine was then decreased for a time, but continued at a later date. When the goitre had quite subsided, the symptoms also cleared up. In severe goitre with pressure symptoms of long standing operation was advisable. Of a total of 249 patients, 176 were treated and 142 were cured; twenty-one were improved, two were not improved, eleven were still under treatment. Many of these had mild hyperthyroid symptoms. Adenoma or simple goitre could be readily treated by iodine. Toxic

adenoma and exophthalmic goitre were more suitable for the surgeon.

Dr. Butler made out a strong case for the importance of septic foci in various situations as a causal factor and emphasized the necessity of their efficient treatment.

Infant Welfare Work.

DR. VERA SCANTLEBURY, Director of Infant Welfare in the State of Victoria, read a paper on some aspects of infant welfare work in that State. In 1917 they had dealt with 913 babies in one centre and had paid 1,407 home visits. In the course of ten years the number of centres had increased to sixty-nine and in 1927 25,735 babies had been handled and 62,535 home visits had been paid. The average attendance per child had risen from between four and five to between seven and eight.

The keynote of the Victorian system as compared to others was the extensive support given by the municipalities. In addition to the Government subsidy of a maximum of £125 for each approved nurse, fifty-six municipalities supported the centres. They elected a voluntary or managing committee or the health committee of the Council took action. No less than thirty had provided accommodation in buildings that had cost from £300 to £6,000. Two voluntary associations by their respective central councils controlled the various centres. Dr. Scantlebury considered that amalgamation of the two was advisable in order to insure uniformity in the training of nurses and in educational measures.

The new regulations (1927) introduced by the Minister of Health, the Honourable T. W. Beckett, prescribed a special infant welfare certificate gained after study at a registered training school and by examination by the Nurses' Board. This course was open to generally trained nurses.

Concerning the training of midwives Dr. Scantlebury had recommended that all midwifery trainees should obtain a mothercraft certificate at a registered infant welfare centre. This represented a less advanced course than that required for the infant welfare certificate. Further, at all midwifery training schools one at least of the nurse lecturers should hold this mothercraft certificate. This was designed for the benefit of midwives other than generally trained nurses.

A special feature of the Victorian scheme was that its extension was made possible by lectures, demonstrations, literature and other teaching given in connexion with the better farming training. Thirty-four centres had been formed in rural areas as the direct or indirect result.

The relationship of the medical profession was both intimate and friendly. The presidents of the two infant welfare organizations were medical men and each had a medical committee with representation from the Victorian Branch of the British Medical Association. A medical director was in charge and the local centres were supported by the medical officers of health. Co-operation had been insured by the drawing up of suggestions for guidance concerning medical health which had the approval of the Council of the Victorian Branch of the British Medical Association and the medical and nursing units concerned. Preliminary to the opening of a centre the Director visited the local practitioners. The scheme had been constantly brought before the Victorian Branch of the British Medical Association and also medical students in training.

Many local centres had a medical adviser on the committee. A part-time medical officer lectured to trainees and the City of Melbourne had a whole-time medical officer of its own to supervise antenatal and child welfare work.

Training was given in the antenatal departments of the Women's Hospital and the Queen Victoria Hospital for Women and Children. Infant welfare nurses had access to the after-treatment wards of many hospitals in order to invite mothers to their centres. When the baby was discharged from hospital the district nurse was informed. In regard to premature babies an urgent notice was given.

At the Women's Hospital an infant welfare centre had been established in the hospital itself and all mothers applying for the maternity allowance were interviewed. A notification was sent from the Children's Hospital with clinical details in connexion with each baby on discharge.

Similar cooperation had been established in many country towns between the district or maternity hospital and the local centre. In one town all the medical practitioners were keen supporters, while the infant welfare sister, the sister in charge of the hospital ward for women and children and the bush nurse held infant welfare certificates and the work was conducted with harmony and success.

This scheme had been given in detail to emphasize the excellent possibilities and the importance of the fullest medical cooperation.

Dr. Scantlebury outlined the conduct of a natural feeding campaign. First and most important of all was prenatal care. The influence of this was evident; the number of out-patient attendances of the expectant mothers at hospitals had increased by eight to more than twenty times. In the next place there was the educative literature. The third factor in the campaign was the infant welfare nurse and the bush nurse and their home visits. Forty-eight bush nurses had attended infant welfare courses. One infant welfare nurse was needed for each 10,000 population or 300 babies *per annum*. In the fourth place maternity nurses needed to have mothercraft training. Special baby nurses should be attached if necessary to maternity hospitals. Home help was required for a social service bureau. Lastly it was essential to have mothercraft homes for special purposes and for trainees.

The form of artificial feeding has been analysed. Cow's milk was employed for from 67% to 69% of all artificially fed babies; dried milks were given to from 14% to 16%, condensed milk to from 9% to 10%, proprietary foods to from 2% to 3.5%, mixed foods to from 4% to 6% and pasteurized milk together with some fresh element such as orange to a smaller proportion. Dried milk might be substituted if the home conditions were bad. Condensed milk was given only on medical prescription.

The modification of milk on the Truby King plan had been found useful. It was, however, necessary to adopt a correct standard measure and a standard method of using it. Household spoons varied greatly and often yielded a 100% error. The "Lactogen" measure was satisfactory as a standard, but to get accurate results the spoon should be tightly packed and pressed level. This was found to be the most reliable way. Three tablespoonfuls and one teaspoonful of "Lactogen" packed tightly weighed one ounce; if loosely packed five tablespoonfuls were required and if shaken and levelled three and three-quarters.

A chart had been prepared for the nurse by which she could obtain accurate percentages by this method. In the chart the mass, indicated by packed levelled table and teaspoons, a variety of foods in powder form was shown to be equivalent to given percentage increases of carbohydrate or fat.

Dr. Scantlebury advocated the adoption of early notification of births as in Tasmania.

Invitation letters were sent to every mother and the nurse called at the home and left an invitation card. The letter was necessary in outlying country areas. This early contact was invaluable if the maintenance of breast feeding, the essential method of prevention of mortality, was to be insured.

The need for this advice and assistance was realized from the figures taken for July, August and September, 1927, of the feeding of 4,300 to 5,200 babies. From 52% to 54% of the babies, all of whom were under nine months of age, were entirely breast fed; from 16% to 17% were partially breast fed; from 30% to 31% were artificially fed. The partially and wholly breast-fed babies totalled from 69% to 70%. The analysis of breast-fed babies in age groups was especially useful. A table was exhibited with the figures for the three months.

The average fat content of retail milk sold in Victoria, apart from the seasonal variations, was 3.6% in

standardized, 3.9% in genuine milk from mixed herds and 4.2% in genuine milk from Jersey cows.

The best guide to the amount of food at different ages was the average weight for age from which the caloric needs could be calculated. Breast milk averaged as a supply twenty calories to the ounce or 703 to the litre.

It was futile, however, to seek to adapt children to tables which were merely general guides. This fact was often forgotten when enthusiasts advocated one so-called system of feeding.

Distinct divergencies between age-weight on the one hand and the caloric requirement for each unit of body weight were shown in Truby King's and Pritchard's tables. According to Truby King's tables the range in the second and in the twelfth month respectively was from fifty to forty calories; according to Pritchard's tables it was from fifty to forty-five. Taken in conjunction with the weight chart adopted in each case, the amount required daily varied from 25.5 to 40 ounces (0.725 to 1.135 litres) in the second and in the ninth month, according to Truby King, and 21 to 41 ounces (0.596 to 1.165 litres) according to Pritchard.

Dr. Scantlebury exhibited the age-weight figures of babies in infant welfare centres during the previous ten years. The weight was taken without clothes. Only healthy normal fully breast-fed infants were included up to nine months and from nine to twelve months only those on normal transitional diet. Illness or blemish of the infant or illness of the mother in the expectant or nursing periods excluded the record from selection.

The return was for city infants. She announced that analysis into sex and locality (residential or industrial) would be given at a later date.

In conclusion there was no question but that natural feeding was the best preventive; next to that were the clean careful handling and correct modification of artificial feedings, together with the application of mothercraft knowledge, especially concerning regularity of feeding and habits, suitable clothing for hot weather, no dummy and protection against flies.

Infant Mortality.

Dr. A. W. SHUGG in a review of the factors bearing on infant mortality pointed out that the solution of the question of the unfit lay in the prevention of their birth. On the other hand, the lowering of the infant mortality was attained, not by the prolongation of the lives of the unfit, but by the prevention of the sacrifice of the unfortunate.

A considerable decrease in deaths of infants was followed by a fall in the death rate under five years of age, suggesting an increase of resistance to disease during childhood and the production of a healthier race.

He referred to the need for investigation into prenatal causes of early death in infancy and the need for cooperation between antenatal and postnatal controls especially as regards syphilitic mothers.

He drew attention to the low rate of death from diarrhoea in Tasmania (10% of the first year deaths) as against the general rate for Australia (17%). Tasmania had the advantage of an insular climate with an agreeable yearly temperature. Excessive heat might cause certain babies to die from primary heat stroke and where prolonged many, especially the artificially fed, lost so much resistance as to become victims to the mildest infections. Better housing in very poor areas and the reduction of the temperature at night together with education in hygiene might overcome these ill effects.

Excessive heat affected the milk supply and spread by flies. Universal and properly guided breast feeding was undoubtedly the most effective measure. It was hoped that in a few years for a mother not to feed her infant would be universally recognized as a moral crime.

The antagonistic attitude of some midwifery nurses against child welfare nurses had to be overcome by better training and control.

Artificial feeding brought greater risks; modified fresh cow's milk was usually adopted. Two schools existed, the

first favouring a high percentage protein and low fat percentage, the second, as in "humanized" milk, low percentage protein with high fat percentage. Either might work well, but the combination of the two, high protein and high fat was disastrous.

Care as to details of feeding, such as cleanliness, was more important than either percentage system. Where the milk supply was risky and where mothers were ignorant, as in many industrial areas, dried milk was safer.

Individual care of the child's diet might be important. Child welfare nurses had to realize that the food must be adapted to the baby, not the baby to its food. The physician must recognize that the nurses do not supplant him, but could assist by sending along sick babies in an early stage. Infant welfare centres should be extended to cover the whole area of the Commonwealth. All centres, prenatal clinics and the other organizations should be closely linked up with the main public health organization.

Little decrease had been made in mortalities from respiratory causes and the acute infectious epidemics of diphtheria, measles and whooping cough. The association with the "common cold" and the meteorological factors were important.

The need for registration of still-births and of the drastic effect of syphilis was emphasized. Vigorous antenatal antisyphilitic treatment might reduce the mortality from syphilis. The preschool age should be protected more definitely so as to prevent spread of infection and obtain thorough convalescence.

Differential Action of X Rays.

Dr. W. MOPPETT read a communication on the action of X rays of varying wave length on the allantoic cells of chicken embryos. Tissue reaction appeared to be a function of the wave length employed. A special pathological picture could be created by one particular wave length, probably by effects on atoms. This was therefore fundamental in character. For example, pathological proliferation was produced by rays of one wave length in membranes with migration of cells. The response to another wave length was a fibrous reaction. The atoms in the allantoic membrane comprised 95% of water, 4.5% of light atoms, containing carbon, hydrogen, nitrogen and oxygen and 0.5% of medium weight atoms comprising potassium, sodium, calcium and chlorine compounds. There was further 0.01% of lead, with traces of zinc and uranium. The differential action of X rays was unlikely to affect water, but might have some association with the heavier atoms. It was important to discover the cause of proliferation and what determined control. Ordinarily repair ceased at a given time, but not so in new growths. Control might be local, for example, the epithelium preventing the closing of sinuses. In cancer no hard and fast line seemed to exist between the growth and repair, all stages of disorderly repair being found.

Cancer Research.

Dr. Moppett demonstrated examples of experimental cancer in animals and said that a mutual reaction occurred between cancer and body cells. Only in very malignant growths was this interaction in abeyance. Studies had been made in the problem of general control by means of substances in the body fluids. Lumsden had demonstrated immunity with inoculated cancer of rats and mice and the attainment of cure by the use of serum. In mixed tissue cultures of cancer cells and the heart muscle cells of the mouse a serum of an antimalignant type killed the cancer cells in ten minutes, while normal cells were still alive after twenty-four hours. Immunity was an important objective, whether obtained by serum or by radiation.

Dr. Moppett described the various aspects of the world wide campaign of research and the necessity for co-ordination in various phases of research activity. The cancer research organization was affiliated with the British Empire Cancer Campaign and this had prevented much overlapping and helped to coordinate results of various

workers. The attempt in Sydney was to study radiotherapy first by the study of normal tissues. Apparatus had been acquired for the scientific treatment of the cancer patient by means of radiotherapy. If this resulted in even a very small reduction of the mortality or the saving of some of the pain associated with the scourge the work would be amply justified.

PROFESSOR VONWILLER described the apparatus installed at Sydney University.

PROFESSOR J. B. CLELAND discussed the pathological aspects of cancer and various theories of causation. It was possible that cancer was directly due to some virus establishing itself in the cells, compelling them to behave in a bizarre fashion and perhaps means might be found to prevent such a parasite gaining entrance to the cells or destroying it when once it had done so. Again, work had been carried out to ascertain the form of chronic irritation in various regions that predisposed to cancer, of which he gave several examples. New work had been undertaken as to the best means of killing or crippling cancer cells, leaving the healthy tissues unaffected.

X rays and radium had been used in an attempt to destroy or injure cancer cells, as was lead. To his mind sufficient attention had not been paid to the gametoid theory of the nature of cancer. It was difficult to conceive of any cell taking on activities of an entirely new order. The cancer cell did merely what it had an inherited capacity to do. Much attention had been paid to the possible effects of the sophisticated modern diet. It might be that some subtle substance taken in food from time to time irritated the cells of the stomach. It would be interesting to ascertain whether cancer occurred in inmates of hospitals for the insane who had been resident for a period of thirty or forty years. If these insane persons were less liable, it would suggest that their less sophisticated diet was free from the cancer factor. Investigation was necessary to ascertain the causes of the chronic irritation of malignant disease in the alimentary canal. Despite the absence of the clay pipe, cancer of the lip was as common as ever. Exposure of the lip to weather conditions and the sun's rays was more likely to be responsible. It was necessary in the education of the public to steer between various extremes. Three attitudes were common in the general community. The first was that of introspection with imaginary discoveries, the second was that a person might be quite unaware of any symptoms and signs and the third was that of sheer fear that the condition might be discovered. Everyone should understand that after the age of forty medical advice should be sought for all unusual symptoms. A sore on the lip which did not heal within ten days, bleeding from the nipple and such like should cause a person to seek medical advice which was readily accessible. The cost, however, was a serious matter to the middle class populations. Repeated examinations were often necessary and the treatment was necessarily prolonged. No greater boon could be conferred on the people of Australia by a generous benefactor than the endowment in capital cities of well-appointed hospitals for the middle classes, who after all were the backbone of any community and to whom a serious illness was a calamity. In the well-equipped intermediate hospital with sufficient private endowment, no extra fees were required for X ray examinations, pathological reports and the use of the operating theatre; the fees were on a reduced scale. A person with unusual symptoms should be overhauled every six months and it was important they should be taught to think in healthy fashion.

The Teaching of Hygiene.

Dr. W. J. SPRINGTHORPE found that Victoria and the other States of Australia were in need of reforms and extensions in regard to health and education. Even more than England they were "at the door of opportunity" and it was their "duty to lay the foundation of a new epoch." Enlightenment was the basis and measure of advance. The Australian health propaganda left little to complain of in regard to quantity, but it lacked an authoritative central council to formulate and enforce the best standards.

Public health was but personal health "writ large" and in consequence the best results were obtainable by health education of the individual. This view had not reached the school. His crusade was to concentrate on the school and to make personal health the most important object of its training. It was impossible to obtain full satisfaction under the existing system. It provided experience for the scouts of intelligence, the senses, but it could scarcely be said to train them scientifically. Too little attention was paid to the hand, save perhaps in some of the schools for the mentally defective in which the moron was better served than the mentally normal. In man the senses had to be educated and directed. The schools did something practical for the instinct of self preservation, but they ignored the more important instinct of self reproduction to the untold tragedy of innumerable lives. The prime responsibility rested with the parents, but the fundamental emotional crisis of puberty occurred in the middle of intellectual education. The teacher was then in *loco parentis* and there were ways in which he could assist scientifically without trouble or danger. Too much emphasis was placed on the cultivation of the intellect and too little attention was given to the emotions. The latter were the masters and not the servants of the former and were supreme in both beliefs and conduct. It was a comparatively new discovery that the factor of psychology was the underlying influence upon efficiency. He claimed that the educational system paid too little attention to psychology. Even though some psychological instruction was given to some teachers, these teachers were neither sufficient in number nor sufficiently trained.

In the next place he raised the question whether the existing education fitted boys for their life work or girls for their domestic duties or both for their sphere of citizenship. He maintained that the school was not sufficiently in touch with the home, with infant and child welfare workers and with local educational and other auxiliary bodies. Close cooperation between the school and the home and child welfare worker was essential for the best results. In summing up his findings, Dr. Springthorpe stated that the education system in Australia lacked effective presentation, truer standards of values and a wider objective. In his judgement the defects of the school reached their climax in its relation with school health. Owing to other forms of neglect children entered the schools by the thousand suffering from an amount of ill health that was appalling. This ill health was never thoroughly remedied. This intensified and magnified the need for medical inspection and treatment which accrued in the ordinary course of school life. In England they had demonstrated how the conditions could be met. There was a complete system of medical inspection at three periods of the children's school life. With a population of only twenty-five times that of Victoria, they had 1,140 medical officers of health, including 240 whole time school officers, 567 whole time school and health officers and 241 women officers. There were also 584 school dentists, of whom 259 were whole time, 786 specialists of whom sixteen were whole time and 4,520 nurses, including 1,166 whole time school nurses, 1,317 whole time health nurses and 1,745 whole time education nurses. The scope of school medical treatment included minor ailments, eye, nose, throat and dental affections and orthopaedic conditions and embraced X ray treatment. There were school clinics and hospital treatment. In 1927 no less than 1,733,107 children had received medical attention. In addition open air schools, special food for weakly children and so forth were provided and there was special early teaching in the ordinary elementary schools for many of the lesser grades of the mentally defective. He compared this state of affairs with that disclosed by Dr. Jean Grieg of the Victorian schools. In 1927 48,648 children had been examined out of a total of 301,413. Out of a total of 7,241 teachers 1,446 had been examined. There was a staff of eight medical officers, five dentists and two school nurses. The work was so arranged that the whole State was covered each three years. It was clearly impossible to build the superstructure of a disease proof community upon such foundations. The same story of grave insufficiency appeared when they examined the question of the instruction and practice in the way of health. Instead

of being in the forefront, personal health was rarely mentioned among the subjects. It was often absent from the time-table. Nowhere was it on the same footing as spelling or arithmetic.

In Daley and Viney's book the English ideal was explained. No formal lessons were given to children younger than ten or eleven years. There was a separate syllabus for boys and girls, for the children in the elementary, central, continuation and secondary schools. The principal health rules were taught not in set lessons but during other lessons, such as breathing exercises during singing, balance during physical instruction, proper diet in gardening, cleanliness and clothing in geography, the hours of sleep and the cost of proper diet in arithmetic. For the senior boys and girls in the secondary schools there was a further syllabus under nine headings, the sick poor, the industrial revolution, healthy workers, State insurance, environment, mothers and children, the care of the sick, public health and hospitals. For girls in the senior classes there was also a syllabus under twelve headings, rules for a healthy life, mother and baby, baby's diet for nine months, baby's diet up to two years, rules of health for baby, habit in childhood, cleanliness in childhood, exercise in childhood, clothing for children, mothering and stimulation, mile stones in a child's life, State and other aids for mothers and children. While these were not universally adopted in England, they indicated the trend of events. He did not know whether any attempt was being made in Victoria to reach these ideals. Many years before Mr. Brodribb, then Director of Health, had drawn up a health and temperance primer. Examinations had been held on the lessons contained in this work every year since that date. At first the examinations had been attended by a few hundred pupils from a few scores of schools. In 1927 the attendance had reached its minimum; there had been but eighty-eight children from twenty-two schools. The Health Society had come to the conclusion that the failure had been due to the voluntary character of the work and to the fact that health had not been made a compulsory subject. Dr. Springthorpe would add that absence of interest and absence of instruction were also responsible for the failure. A new, up-to-date primer for Australia was required.

Many of these advances and extensions could be accomplished by reorganization, by readjustment of outlay and by recognized cooperation between the local educational bodies, the Health Department and the municipal and voluntary workers. At the annual dinner of the Society of Medical Officers of Health in England in 1927, the President had pointed out that less than 20% of the school nurses were engaged on school work only. No less than 30% combined health education work with school work and 40% were district nurses not employed by the department. He also stated that only 20% of the senior and assistant medical officers were engaged on school work exclusively; the Board of Education utilized the services of general practitioners to a very large extent. Dr. Springthorpe recognized that behind all this was the question of expense. Individual and national health was the best asset of the community and the money saved by reducing disease to the minimum could not be overestimated. It was doubly worth the nation's while to pay the price. It was not necessary for the whole expense to fall upon the government. In 1926 over seventy millions had been spent in England on education. More than half had come from parliamentary votes and grants, about two-thirds of this sum had been raised as local rates and approximately six millions had been subscribed as contributions, fees and interest. The public had become so interested in health and so satisfied concerning its value that its wish was to pay the fair price. It would welcome extension rather than retrenchment. The local rates had been raised in England to a very high figure, largely to meet these requirements. The Minister of Health had stated at the annual dinner of the Society of Medical Officers of Health that there had been no lamentations regarding the burden. No single voice had been raised in favour of cutting down the preventive services of the

medical officers. In Australia the real need was as great, though it was less apparent. The municipal and other local authorities, though alive to the importance of an all healthy body of ratepayers, had made only a beginning by supporting the establishment of systems of child and mother welfare. It appeared that the local authorities had to obtain special powers to strike a special rate. So great, however, had been the interest taken that he felt sure that it required only a little initiative on the part of the ratepayers and their confidence in wise expenditure to move the majority of the local councils in the desired direction. The time was ripe for an almost undreamed of extension. People were already thinking and acting in terms of health and not of disease. They preferred real prevention to the most elaborate cure. They waited to be led. It was for the authorities to confer, to combine and to provide the best.

SECTION OF PHYSIOLOGY AND EXPERIMENTAL BIOLOGY.

Adaptation to Australian Conditions.

PROFESSOR H. G. CHAPMAN in his address as President of the Section of Physiology and Experimental Biology, spoke of the adaptation of man to Australian conditions. He emphasized the necessity for methods of precision in testing the differences between individuals and between groups of individuals, both men and women, caused by climate, occupation or diet. In these methods it was necessary to obtain values to give a measure of the quantity of difference, for example a drop of 10° in the rate of cooling was not twice the rate of a drop of 5° . Again, although the limit to prevent heat stroke in air saturated with moisture is taken as 32° C., in Broken Hill men worked efficiently for three hours at 40° C. with 99% humidity, while in other circumstances satisfactory work was conducted at 57° C. dry bulb and 42° C. wet bulb. In Bendigo men had worked at 32° wet bulb for years. The mouth temperature approached the blood temperature in the Queensland coastal district during the summer. This occurred more often in women and was also found in Sydney in February and March when a wet bulb temperature of 24° C. and a dry bulb of 26° C. raised the mouth temperature to 37.5° C.. This was an important observation from the point of view of clinical medicine.

Another investigation revealed the fallacy of metabolic rates determined in Europe being taken as standards for Australia. These rates were usually obtained in closed calorimeters and did not correspond with Australian conditions with abundant sunlight. There was some evidence that the body absorbed radiant energy and that certain wave lengths in the solar rays might have a very potent action in contributing to the heat of the body.

The daily food requirements were given in Europe as 100 grammes of fat, 250 grammes of carbohydrate and 100 grammes of protein. In America the corresponding figures were 100 grammes of fat, 300 grammes of carbohydrate and 134 grammes of protein. Australian figures for students during July, August and September differed materially from these two standards. They were 75 grammes of fat, 265 grammes of carbohydrate and 95 grammes of protein. The reduced fat intake was noteworthy while carbohydrate consumption remained high. In each test the method of preparing two identical meals, one eaten, the other analysed, was followed. It was assumed that solar radiation acted by sparing food and reducing the basal metabolism.

Miss Hindmarsh had studied the basal metabolic rates of fifty male and twenty-six female students at the University of Sydney. She had found that the rate among the men was 8.9% below the predicted rate according to Du Bois's and Benedict's tables. The rate was lower in fifteen and higher in seven. The rate among the women was 10.5% below the predicted rate. In nine it was lower and in three it was higher. The inference was drawn that metabolism was influenced by the process of adaptation.

A still more interesting investigation in connexion with metabolism was the testing of the daily excretion of urea in one thousand Sydney University students. Less protein was used up by the Sydney students than by persons in

Europe and America. Economic influence on the cost of meat had reduced meat consumption.

Priestly and Hindmarsh in a study of the blood urea concentration in fifty-eight men and seventeen women had found that in 29% it was ten milligrammes or less, in 49% eleven milligrammes or less, in 69% twelve milligrammes or less, while in only 16% was it fourteen milligrammes or more. The average urea nitrogen in the blood was 11.7 grammes, the total excretion of urea in twenty-four hours 21.5 grammes, the total nitrogen excretion 11.2 grammes and the protein metabolized in twenty-four hours 17 grammes. This confirmed the previous findings.

Data were given illustrating the need for the proper study of the range of variation in measurement as against the arithmetical average. Cotton in recording the rate of heart beat in medical students of the same year, the record being taken in the resting condition, showed distinct differences in the variation in the two age groups, fifteen to nineteen and twenty to twenty-four years old respectively, though the average in both groups was 72.3 beats per minute. The range between the lower and upper quartiles in the two groups was 68 to 77.2 as against 66.1 to 78.1, the much wider range of variation being present in the older group. Athletes were all found in the series with under 65 beats, while those following an indoor life occasionally had a high rate. The association with occupation was suggestive and the need for further research along these lines was obvious.

From the child welfare point of view Wardlaw and Dart's investigation was most illuminating. In 120 specimens of human milk a definite association of the percentage of protein with the age of the child was demonstrated, the figure falling from about 3% at birth to about 0.5% at two hundred days after birth.

Further details were given of the investigation undertaken under the supervision of Dr. S. A. Smith and Professor H. G. Chapman with regard to shapes of healthy Australian women. Standards had been outlined of the shape of the trunk recorded in figures from which replica models could be made and compared with the living. The results were very different from the so-called correct classical posture, the result of anatomical sections of the dead. Six thousand records were available and correlations had been made between certain important measures, for example from the antero-posterior diameter of the chest, the weight and the circumference at the hip, either of three other unknown measurements could be accurately predicted. Further study of the posture of the living and of their structural characteristics was necessary. Everything pointed to very definite adaptations occurring in individuals and groups of individuals to the very varied climatic conditions found in Australia.

SECTION OF ZOOLOGY.

PROFESSOR COLIN MACKENZIE delivered his address as President of the Section of Zoology on the importance of zoology to medical science. He emphasized the importance of comparative anatomy and physiology, especially in regard to Australian fauna in the study of the human body. The lung fish, reptiles, monotremes and marsupials represented a living embryology. In these primitive types such as the lowest mammal, the platypus, the genesis of the use of limbs was seen not only for propulsion but for support. There was further an opportunity for a more thorough study of the relation of function and of structure, the chief difference between man and the platypus being the possession of the erect posture by the human. In the blue-tongued lizard progression took place on the belly wall, the four limbs being used for propulsion only. In the echidna with the abdominal wall off the ground, the four limbs were used for bodily support as well. The kangaroo gained the erect posture by means of a tripod, while through the primates there was a lessening of the use of the four limbs for support till in man, by use of the hind or lower limbs for propulsion and support, the fore limbs were freed for other uses. Erect man alone possessed a prefrontal brain and a well developed forehead. In lowly prehistoric types (Cohuna skull) the

forehead development was absent. The erect posture was effected by muscular action and not purely by balance. In comparing anthropoids and man the knee cap offered an index of the degree of erect posture and intellectual development. The life history of the infant took it through these periods seen in the anthropoid of bent body and bent knees and abducted limbs before the true erect posture was acquired. Professor MacKenzie claimed that a definite sequence of animals possessing the necessary correlation for the ultimate erect posture could be demonstrated. In Australia there was in sequence the blue-tongued lizard, the bearded lizard and the common phalanger or opossum. From the rodent series they passed to the lemurs, the new world monkey, the old world monkey, anthropoids, prehistoric man, the Australian aboriginal to the modern European. The platypus, echidna and kangaroo were not in the direct line of human development. With the development of the erect posture the horizon was extended, vision and hearing improved and memory aroused, followed by intelligence. Man could thus signal and the simplest form of speech was evolved. Weapons for attack were fashioned by the free hands and tactile sense improved. Paralysed children showed an almost immediate improvement in mental outlook when placed in the erect position. A period of three years was spent by the infant in acquiring this balance or muscular action. Much of the day of the modern human being was spent in avoiding the erect posture; sitting, reclining or riding in motor cars were not conducive to muscular improvement. In both treatment and prevention too much emphasis had been given to the attacker and too little to the attacked. The great muscular epochs resulting in the erect posture and superior intellectual development had affected every system of the body. The erect posture which promoted brain enlargement, meant the hitching of the abdominal organs to the dorsal wall to prevent strangulation. The heart had to pump blood not horizontally, but upwards against gravity. These considerations affected the treatment of cardiac disease just as they affected the treatment of the loss of function in the extensor muscles of the knee. The extent in which the muscle retained the function necessary for use in the lowest mammal or in the erect posture was the basis of muscular reeducation treatment in infantile paralysis and neuromuscular disease and injuries. The operations on uterine displacement should be studied along the lines of the history of uterine support. Only along comparative lines involving the study of birth throughout the Australian reptiles, monotremes and marsupials could midwifery be raised from an art to a science. Physical culture, too, should be made to follow along the lines by which the erect posture had been acquired and to help those muscles on which it particularly depended. Rational exercise implied rational rest. Over-exercise in the city man might be an irritant; dullness in school children might be the result of faulty seating accommodation and mental effort expended too much on balance as well as lessons. The laziness of the Australian aboriginal had a physiological basis. His long arm and poorly developed lower limbs placed him nearer the prehistoric types who walked with bent knee and body. The Australian game of football was particularly suitable to the erect posture. He would define health as a correlation of all the bodily systems to the erect posture and ill-health as the corresponding failure. In any case of chronic ill-health an analysis of the postural system should precede all other investigations. An essential to any public hospital was a great department of myology wherein a scientific examination could be made for muscular defects and other matters assessed.

A very fascinating series of specimens was shown by Professor Colin MacKenzie and by Mr. W. J. Owen, Histologist at the National Museum of Australian Zoology, in which the birth of monotremes and of marsupials was especially illustrated, together with three new mammalian ductless glands in the platypus and the disappearance of the thyroid gland in the kangaroo and adrenal gland in the common phalanger. New sets of glands in

the neck of the marsupial and the development of Cowper's glands in the kangaroo were well shown.

Other items in the Section of Zoology of interest were Mr. Musgrave's paper on harmful spiders, already published in the *Australian Museum Magazine*. Mr. Musgrave stated that the spider which had bitten the child living in Paddington, Sydney, recently, proved to be a specimen of *Atrax formidabilis*; all the four persons bitten by this spider had been bitten by males. The two varieties of *Atrax* in addition to the red-spot spider, *Latrodectus*, were the only harmful Australian spiders yet recorded, but many of the 1,200 spiders known were potentially capable of causing injury to man from their bites.

Correspondence.

MEDICAL EDUCATION.

SIR: The letter of Dr. Corlette published in your issue of January 21 is to me of great interest, quite apart from the special problem it is dealing with, namely, The Royal College of Surgeons. I have long been of opinion that medical education must be radically altered in the direction of simplicity. At present speciality after speciality is making its appearance. Each student is supposed to get a smattering of the speciality at a great cost of time and the stage is being approached at which the system will break down by its own weight. It is clear that the length of time devoted to that form of education which requires examinations—a necessary evil—must bear some relation to the total duration of life. With the increase of special knowledge it is certain that in the near future six years will not cover the period of training on the present principle. My experience of a revision of a curriculum is that a number of eminent specialists sit round a table and with perfect sincerity insist on the inclusion of as much of their speciality as is possible in the curriculum, with the result that the time-table is cut up into a mosaic and really becomes a mathematical freak in its adjustment. When the last revision was in progress at the Melbourne University, Dr. Kilvington and others, including myself, formed a minority who asked for a radical reconstruction of the position. We suggested that after the three more or less scientific years, two years should be devoted to pathology, medicine, surgery, gynecology and obstetrics, but that no specialities should be included in that period. At the end of the fifth year a final examination should be held. Those who were successful would then be informed that when they brought back certificates from approved teachers that they had done certain special work they would receive their diploma, but that there would be no further examination. The special work would thus be performed practically as post-graduate work without hurry and with all the interest that would be taken in such work by one who has done with examinations. I feel so strongly on the subject that I left a memorandum in the minutes of the University Council for historical purposes expressing the views of the minority which I feel certain will be adopted at some future date when the present system has been found to be practically impossible.

Yours, etc.,

JAMES W. BARRETT.

105, Collins Street, Melbourne.

February 4, 1928.

PATHOLOGICAL SERVICE.

SIR: In your issue of January 21, 1928, there appears a letter concerning the abuse of government laboratories, signed by "Public Health" which calls for a reply.

There is an obvious inaccuracy in "Public Health's" letter, namely, in the following paragraph: "The pathologists have failed to let the practitioner know that, rather than compel the practitioner to seek the assistance of government laboratories, where no charge is made at all,

they are prepared to give their services at a reduced fee in such cases where the usual fee cannot be afforded."

The contrary is the case. Every medical man who has ever employed any practising pathologist, is aware that a rule exists for such reduction of fees in all cases where requested and also that many investigations are made free of charge altogether.

Furthermore, every medical man who continually avails himself of the services of the practising pathologists, must be aware of the fact that pathologists carry out free of charge as much work as and probably more than other medical men.

A large number of our profession undoubtedly send all their work to government laboratories, because they expect to receive something for nothing. These very practitioners would be the first to complain if our public hospitals adopted a policy of direct competition by treating their wealthy patients for nothing.

Yours, etc.,

LESLIE UTZ.

"Craignish,"

Macquarie Street, Sydney.
February 9, 1928.

PAIN PRODUCTION IN ABDOMINAL VISCERAL DISEASE.

SIR: Referring to Dr. Kinsella's article in the journal of January 21 on pain production in abdominal visceral disease, I feel sure the author deserves many congratulations on such a thorough production which may well be a standard for clinical observations and give a sounder understanding of gastric and allied disorders.

It has referred our minds to the various teachings of visceral pain production, particularly in regard to gastric and duodenal abnormalities and what is more important, suggests a reliable and invariable correlation between pain and an organic lesion, replacing vague ideas of acidity, motility and changing aspects of the surface of an ulcer. The same pain obtains on deep pressure on an infiltrated appendix as on a duodenal or gastric ulcer. It is a deep seated pain in the direct vicinity of the lesion, analogous to the pain produced on pressure of the carbuncle. Is the tenderness experienced by pressure of intestines against sacral promontory of the same nature but modified? I have for some time thought the hunger pain of duodenal ulcer connected intimately with gastric tonus.

As Dr. Kinsella quotes Ryle, "when the stomach is in posture of approaching emptiness, but through reflexly enhanced tonic action its muscle becomes and remains abnormally taut." This is apparently the result of stimuli from the ulcerated duodenum, the fact that this tonus is so much increased in duodenal ulcer, excepting some cases of pyloric stenosis, surely has some bearing on duodenal pain and its relief by food. It would be interesting to note the effect on the stomach of stimulation of the duodenum in its various parts.

I think Dr. Kinsella's theory and Ryle's observation can be brought into line, when one considers the possible effect on the circulatory contents of the duodenum and stomach by such a sustained tonus of an empty stomach and its sudden change on ingestion of food, to a stomach of larger capacity with regard to its arterial and venous blood. Would not this explain the relief of pain in duodenal ulcer and the presence of hunger pain itself, owing to the presence of a gastric reflex which in the case of gastric ulcer is absent?

Might the early opening of the pylorus and its relaxation as in sodium bicarbonate administration soon after ingestion of food relieve the "compression" in the duodenum? May not pain stimuli be not only referred but transformed? It would seem as if the stomach were a centre to which most visceral reflexes are referred, in such forms as pain vomiting, hypermotility, hypersecretion, by duodenal ulcer, appendicitis, gall stone, renal colic and we may conclude the "difference in the pain cycle in

uncomplicated duodenal and gastric ulcers which are sufficiently infiltrated to be painful, depends on the presence in one of a gastric reflex referred to by Ryle and its absence in the other." The blood contents of gastric vessels must be directly influenced by the nervous mechanism of the stomach and duodenum and their combined action be the determining factor in pain and its relief. This is really a combination of physical phenomena, as explained by Dr. Kinsella and nervous control as expounded by McKenzie, Ryle and others.

McMurrich states: "The first intestinal coil is at first indistinguishable from the pyloric part of the stomach and can be recognized only as the duodenum by the presence of ducts from the liver and pancreas." This close morphological connexion between stomach and duodenum, their common blood supply and the continuation of muscle fibres, the "*striæ longitudinales*," into the duodenum perhaps explain the influence of the stomach on duodenal pain.

The appendix and other parts of the viscera are not so closely related morphologically or anatomically with the stomach, yet we see the influence of appendiceal disease on this organ and I suggest that many of these reflexes are defensive in nature and to afford pain relief.

Heat is transferred into energy, may we not yet have to prove that nerve stimuli are not only referred but transformed, for example duodenal pain referred to the stomach and its transformation into motility, bearing in mind the difference between the "tonus" of the empty stomach and the motility of one containing food.

Yours, etc.,

H. V. GILLIES.

Emerald, Queensland.

February 5, 1928.

THE SYMPATHETIC INNERVATION OF SKELETAL MUSCLE.

SIR: The results obtained by Tiegs and Coates after sympathectomy in the goat are so contrary to those obtained here by me that I suggest two explanations:

1. That there was a variation in technique in that the dissection was not carried far enough. This is borne out by their statement when they say that the lumbar cord was exposed from the first lumbar ganglion. This is a very variable structure and may appear opposite the second or third lumbar nerves. In such cases, rami cut below this would not affect the knee jerk or the posture of the limb with regard to the position of the thigh. It is not an easy matter to dissect out the whole of the sympathetic trunk from the diaphragm to the pelvis of the goat and inadequate obliteration must lead to a different result.

The authors do not give me credit for carrying out decerebrate operations. Surely the moving pictures I showed in the Melbourne and New Zealand Congresses were definite enough with regard to the effects upon the decerebrate animal and these results are consistent.

Hunter is credited with saying that lengthening and shortening reactions may be obtained if decerebration and sympathectomy are performed on the same day. I cannot find this reference and in any case it is incorrect since the animals exhibit changes in the operated limb as soon as the sympathetic nerves are cut.

2. Tiegs and Coates do not state their methods of clinical examination. I would remind them that both in the animal and in the human subject it is difficult to get rid of the effects of consciousness which acts upon the muscles through the medullated nerves and can maintain postures.

The only positive result with regard to sympathectomy upon fatigue obtained by Tiegs and Coates I have been unable to substantiate. In clinical cases the limbs actually grow in size and strength and patients are able to resist greater and greater fatigue as time goes on.

It may be that muscles deprived of the stimulation of the sympathetic nervous system are more easily fatigued on account of the loss of tone, but when the subject, both human and animal, is in the possession of consciousness,

this picture is naturally altered. This is shown by the behaviour of normal goats when placed under anaesthesia. The animals always collapse first on the limbs deprived of the sympathetic nerve supply.

Yours, etc.,

N. D. ROYLE.

Sydney.

February 13, 1928.

SIR: In a paper on the sympathetic innervation of skeletal muscle by O. W. Tiegs and A. E. Coates (THE MEDICAL JOURNAL OF AUSTRALIA, February 4, 1928) this statement appears: "Contrary to Royle we find that removal of the left sympathetic trunk in the goat (eight animals) does not affect the posture of the limb, the knee jerks or the tension of the *tendo Achillis*."

This statement is to me specially astonishing, because I was given the opportunity of making a clinical examination of one of the goats experimented upon by Dr. Royle and I had no hesitation in declaring that the muscular alterations in question were present in every particular. (Compare Dr. Royle's paper, "The Treatment of Congenital Spastic Paraplegia by Sympathetic Ramssection," THE MEDICAL JOURNAL OF AUSTRALIA, April 30, 1927.)

It is not for me to attempt to explain this discrepancy of observation, but, realizing the operative difficulties, I cannot suppress the thought that the respective experimenters have not severed identical structures.

Yours, etc.,

ALFRED W. CAMPBELL.

Sydney.

February 13, 1928.

Obituary.

ALEXANDER WELLESLEY FINCH NOYES.

WE announce with regret the death of Dr. Alexander Wellesley Finch Noyes which occurred at Melbourne on February 16, 1928.

HENRY CHARLES MORRISSET DELOHERY.

WE regret to announce the death of Dr. Henry Charles Morrisset Delohery which occurred at Sydney on February 16, 1928.

AN APOLOGY.

In our issues of February 11 and 18, 1928, an advertisement of Essex cars appeared in which Dr. Alan Mackay's name is printed in large type in connexion with the establishment of a motor car record. We wish to explain that Dr. Alan J. G. Mackay had no knowledge of this advertisement and did not authorize it and further that the name was allowed to appear in contravention of a rule of the journal. The Editor offers his apology to Dr. Mackay for having caused him annoyance.

Medical Appointments Vacant, etc.

For announcements of medical appointments vacant, assistants, locum tenentes sought, etc., see "Advertiser," page xviii.

ADELAIDE HOSPITAL: Medical Registrar, Surgical Registrar. COMMONWEALTH OF AUSTRALIA: Assistant Medical Officer. THE BENEVOLENT SOCIETY OF NEW SOUTH WALES: Medical Vacancies.

WESTERN AUSTRALIAN STATE PUBLIC SERVICE: Assistant Medical Officer.

Medical Appointments: Important Notice.

MEDICAL practitioners are requested not to apply for any appointment referred to in the following table, without having first communicated with the Honorary Secretary of the Branch named in the first column, or with the Medical Secretary of the British Medical Association, Tavistock Square, London, W.C.1.

BRANCH.	APPOINTMENTS.
NEW SOUTH WALES: Honorary Secretary, 30 - 34, Elizabeth Street, Sydney.	Australian Natives' Association. Ashfield and District Friendly Societies' Dispensary. Balmain United Friendly Societies' Dispensary. Friendly Society Lodges at Casino. Leichhardt and Petersham Dispensary. Manchester United Oddfellows' Medical Institute, Elizabeth Street, Sydney. Marrickville United Friendly Societies' Dispensary. North Sydney United Friendly Societies. People's Prudential Benefit Society. Phoenix Mutual Provident Society.
VICTORIAN: Honorary Secretary, Medical Society Hall, East Melbourne.	All Institutes or Medical Dispensaries. Australian Prudential Association Proprietary, Limited. Mutual National Provident Club. National Provident Association. Hospital or other appointments outside Victoria.
QUEENSLAND: Honorary Secretary, B.M.A. Building, Adelaide Street, Brisbane.	Members accepting appointments as medical officers of country hospitals in Queensland are advised to submit a copy of their agreement to the Council before signing. Brisbane United Friendly Society Institute. Stannary Hills Hospital.
SOUTH AUSTRALIAN: Secretary, 207, North Terrace, Adelaide.	All Contract Practice Appointments in South Australia. Booleroo Centre Medical Club.
WESTERN AUSTRALIAN: Honorary Secretary, 65, Saint George's Terrace, Perth.	All Contract Practice Appointments in Western Australia.
NEW ZEALAND (WELLINGTON DIVISION): Honorary Secretary, Wellington.	Friendly Society Lodges, Wellington, New Zealand.

Medical practitioners are requested not to apply for appointments to position at the Hobart General Hospital, Tasmania, without first having communicated with the Editor of THE MEDICAL JOURNAL OF AUSTRALIA, The Printing House, Seamer Street, Glebe, New South Wales.

Editorial Notices.

MANUSCRIPTS forwarded to the office of this journal cannot under any circumstances be returned. Original articles forwarded for publication are understood to be offered to THE MEDICAL JOURNAL OF AUSTRALIA alone, unless the contrary be stated.

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